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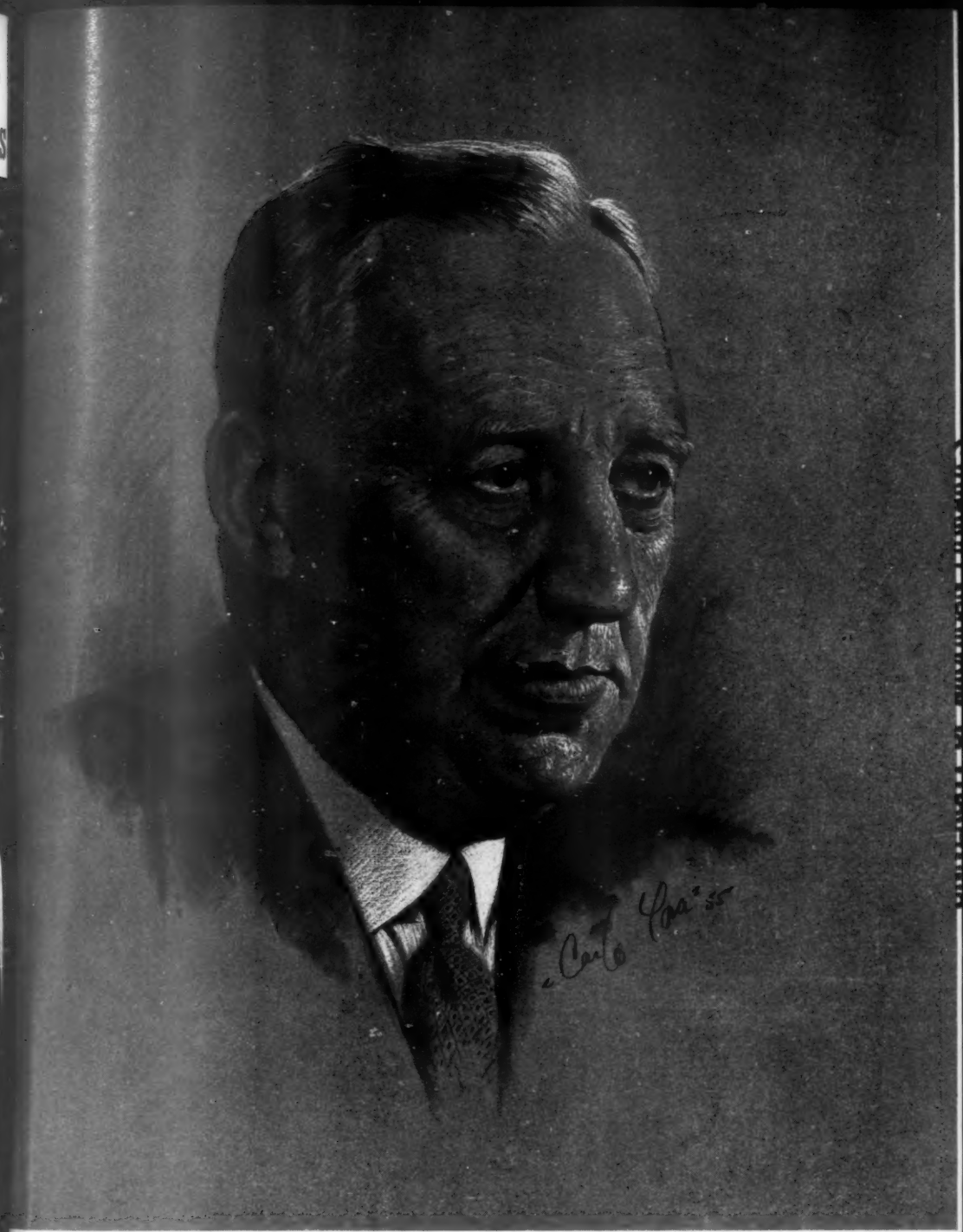

J. F. STANIER.

Chairman, Renishaw Iron Company, Limited.

Leaders of the Industry

MR. J. F. STANIER

IT was perhaps quite natural that Mr. J. F. Stanier should enter the iron trade, as for several generations his family (originating in Shropshire) were connected with ironmaking in North Staffordshire. Thus, on leaving school, he joined the Midland Coke, Coal & Iron Company, Limited. Following a period at Robert Heath & Sons, Limited, he migrated to the North-West Coast to serve on the staff of the Carnforth Hematite Iron Company, Limited. Then the 1914 war broke out, and it was not long before he was serving in Locker Lampson's Armoured Car Unit. On demobilization, he studied metallurgy at Sheffield University under Professors Arnold and Desch. Then for a period he gained considerable experience in foundries until, in 1930, he was appointed commercial manager to the Renishaw Iron Company, Limited, which ranks amongst the oldest foundries and pig-iron producing concerns in the country.

Being an enthusiastic territorial, and holding the rank of Captain, he was mobilized on the outbreak of war in 1939, but was in the following year returned to the works to assume complete management of the company, holding the position of general manager, and shortly afterwards being appointed to the board. Promotion rapidly followed and in 1942 he was appointed managing director and then in 1950 he was made chairman. Under his guidance great changes then took place at the Renishaw Works and they are now finally completing further reconstruction work of mechanical handling plant and a further new blast furnace. As an executive member of the British Iron and Steel Federation, Training Department, West Riding and North Derbyshire, he has taken great interest in the training of personnel both for management and of apprentices and it is interesting to note that nine of his foundry apprentices passed their City and Guilds Foundry Course last year. He has taken great interest in the welfare of all the employees and he has introduced many advanced ideas for social welfare. In addition to other directorships held, he has recently been appointed a member of the East Midlands Electricity Board.

Mr. Stanier takes much interest in public affairs and is a member of Derbyshire County Council. He is proud of the fact that Renishaw ranks amongst the prettiest of modern industrial villages. A liveryman of the Worshipful Company of Founders, a Freeman of the City of London and of the Cutlers' Company, also junior vice-president of the Sheffield branch of the Institute of British Foundrymen, Mr. Stanier has no hobbies other than his industrial and public activities, which he finds make up a full-time job.

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School for Salesmen

Each autumn, the London County Council publishes a brochure which we believe is called "Searchlight." Its contents are amazing, as therein are to be found details of evening classes covering a great multitude of intellectual, craft, and recreational activities. Next year, one more will have to be added, as during the last session the Borough Polytechnic has been operating a course in foundry practice designed to serve the needs of technical representatives of firms offering plant and services and calling upon manufacturers of castings. It was created as a result of negotiation between the Polytechnic and a large manufacturer of crucibles and refractories. Initially, there were enrolled 15 students for the current session, and after six months there are still 11. For a new class this is quite satisfactory, but not—at the moment—sufficient to warrant indefinite continuity.

For two years now, there have been no evening classes at the Borough—save this one—in foundry practice, though the part-time day classes are functioning quite satisfactorily. A new class usually taps a reservoir of entrants, and it takes a few years for it to become established. For the new technical sales class, there must be a large number of potential students in the London area, but many, being "on the road," would find difficulty in attending regularly. Yet, there is little doubt that such courses could be successfully operated every two or three years, which would give time for the creation of a new reservoir of potential students.

Great emphasis is being placed on quality of salesmanship, and surely a technical knowledge of the industry served is a primary requisite. The modern engineering works buyer has acquired either by experience or specialised study, the techniques of the establishment in which he is an important official. This enables him to decide as to whether it is or is not worth-while to allow a sales representative to discuss problems with the departmental managers. If a salesman, through his conversation with the buyer, can show that he is a good technical man, difficulties will be smoothed out. This type of technical knowledge is of especial value when a representative is sent abroad, as the overseas manager expects every salesman to be better informed than himself on the products offered. This implies that the salesman must be thoroughly cognisant of foundry processes. Whether the unique class in London is capable of being extended to other large cities is doubtful, but the underlying principle of having budding salesmen properly trained is of paramount importance for the economic progress of this country. An interesting feature about this class is that the major support comes from a company which has for long years given its representatives a very thorough practical training in its own demonstration foundry.

Correspondence

SHIPPING *via* NEWPORT

To the Editor of the FOUNDRY TRADE JOURNAL.

SIR,—It is particularly interesting to note the efforts of Newport (Mon.) to popularize the use of their port facilities by Midland manufacturers. In considering this matter, manufacturers may be interested in our recent experience.

We have been shipping regular consignments of identical merchandise from Liverpool. On one recent occasion we were told that after leaving Liverpool the boat would be calling at Newport, and so as to give us more time to complete a bigger consignment our customer asked us to send the material to Newport to catch the same boat a few days later. The Newport shipping charges turned out to be £40 11s. 8d. (reduced after protest to £35 17s. 2d.). Liverpool would have charged £6 11s. 8d. Who can blame us if we now avoid Newport like the plague.—Yours, etc.

for Hunt Bros. (Oldbury), Limited,
E. IVESON,
Director.

The Griffin Foundry, Oldbury,
near Birmingham.
May 3, 1955.

RE-DESIGNING STEEL CASTINGS

To the Editor of the FOUNDRY TRADE JOURNAL.

SIR,—We refer to the paper entitled "Re-designing of Steel Castings to Ensure Soundness and Reduce Costs," in your issue of April 21. The third paragraph bears the sub-heading "locomotive wheel-centres" and it is this that has engaged our close attention.

It seems a fair assumption that the new design referred to is the SCOA-P wheel centre for which this company holds the sole selling and manufacturing rights for Great Britain under a licence granted by the original inventors and patentees, the Steel Company of Australia (Pty.) Limited.

The paragraph contains facts and assumptions which, whilst not being completely inaccurate, do not convey the true picture of the object in designing and developing this wheel centre, and we are a little surprised that the author did not seek assistance and advice from those engaged in the manufacture of this article before using it as an illustration of the point he wished to make.

All germane literature, all drawings and, for that matter, all castings made in this country, bear some evidence or another of the fact that the wheel centres concerned are subject to Patent rights and that this company, in conjunction with the Vulcan Foundry who act as technical advisors, are responsible for the exploitation of this design. Had we or the Vulcan Foundry been approached by the author, we should have been only too happy to provide him with the full and accurate story concerning the birth and subsequent growth of this invention.

We do not feel that any great harm has been done by this publication but we do feel that some acknowledgment to either this company or, at least, to the original inventors, the Steel Company of Australia (Pty.) Limited, would have been at least gracious and that had such an approach been made the whole paragraph might have been improved by virtue of closer adherence to the facts.

Quite apart from the outcome of your possibly referring this back to the author we do ask you to publish in your paper at your convenience some reference to the fact that the design used by the author was in fact the SCOA-P wheel centre, a design which in the past six or seven years has been introduced to railways all over the world and still has a great future before it.—Yours, etc.

E. D. WELLS,
for W. H. Morton,
General Sales Manager.

K. & L. Steelfounders & Engineers, Limited,
Letchworth, Herts.
April 25, 1955.

Luncheon

BRITISH NON-FERROUS METALS RESEARCH ASSOCIATION

The annual luncheon of the British Non-ferrous Metals Research Association was held at the Savoy Hotel last Monday. Dr. Maurice Cook presided and with him at the high table were Mr. R. Maudling, M.P., Minister of Supply; Mr. A. B. Waring, D.L.; Mr. W. F. Brazener; Mr. F. C. Braby, M.C., D.L.; Sir Hugh Beaver; Sir Edward Boyle, Bt., M.P.; the hon. R. M. Preston, D.S.O.; Dr. James Taylor; Dr. Horace W. Clarke; Sir James Helmore; Sir John Lang; Mr. D. P. C. Neave; Dr. L. B. Pfeil, O.B.E., F.R.S.; Major C. J. P. Ball, D.S.O., M.C.; Mr. F. J. Erroll, M.P.; Sir Ben Lockspeiser, K.C.B., F.R.S.; Dr. L. G. Brazier; Mr. Robert Carr, M.P.; Professor C. W. Dannatt; Sir Owen Wansbrough-Jones, K.B.E., C.B.; Mr. G. E. Dono; Mr. H. E. Jackson; Mr. W. Strath; Mr. W. F. Slater; Professor A. J. Murphy; Dr. H. F. Willis; Dr. B. K. Blount; Professor J. W. Cuthbertson; Mr. W. H. Henman, and Mr. T. M. Herbert.

Forty Years Ago

In our issue of May, 1915, the Editor made quite an attack on Professor Arnold for a probably Government-inspired statement designed to show the superiority of metallurgical research qualities and results in this country as compared with Germany. The Editor finished up his attack with the statement that "Rivalries between British and foreign universities are at the best only of academic interest. What really concerns the country is the attitude of its vital industries to improvements, expansions and increased efficiencies." This still sounds a sane judgment. The prohibition of the export of pig-iron benefited the foundry industry as prices declined somewhat. There was still an atmosphere of "business as usual" about trading conditions.

NINE VEHICLES, loaded with 30 tons of equipment, have left the Peterborough engineering works of F. Perkins, Limited, on a round of the year's agricultural shows.

International Foundry Congress—Registrations are coming in very slowly to the Manchester office of the Institute of British Foundrymen. It will greatly facilitate matters if applications for places at the various functions are not left until the last minute and intending participants in this country particularly are urged to avoid further delay in registration. The "deadline" is May 21!

Carbon-dioxide Process*

By D. V. Atterton M.A., Ph.D.

First is given a historical introduction to the process and a note on limitations. Next, sand properties and reactions to treatment are given in considerable detail as are methods of introducing the gas, including the postulation of mechanical systems for mass-production of moulds and cores. Concluding sections deal with surface finish of moulds and castings and collapsibility of the sand. Following the Paper, discussion at the Birmingham branch meeting is to be recorded.

Introduction

Within the past year there has been considerable interest shown in this country in a new process for the production of hardened moulds and cores. This process, generally known as the carbon-dioxide process, consists essentially of mixing a clean dry silica-sand with a waterglass-based binder, compacting the sand into shape and then hardening by passing carbon-dioxide gas through the sand. This hardening is due to a chemical reaction and takes place very rapidly, in fact, in a matter of seconds for most normal size cores and moulds. The exact origin of the process is somewhat obscure, but it appears to have been developed on a foundry scale in Russia and neighbouring countries within the last decade. However, it is of considerable interest that the process was referred to in an English Patent of 1898, but evidently stimulated no practical work at that time.

The use of sodium silicate as a binder material, either alone or in conjunction with chemicals that decompose the silicate,[2] has been employed for some considerable time but, in the past, several objections have been raised against its use for sand moulds and cores. It has been suggested that due to the fluxing action of sodium silicates, severe sintering of the sand would occur at high temperatures; this sintering could lead to bad collapsibility of the sand, severe metal penetration and burnt-on sand and possibly mould and core deformation at high temperatures.

Petrzela[3] in a very extensive article on the process, points out that the function of sodium silicate in the carbon-dioxide process is quite different from that occurring in the earlier straight sodium-silicate sand-mixtures where it is allowed to air dry after moulding. In the latter type of mix, the silicate simply dries to a hydrated form without any decomposition taking place, whereas with the carbon-dioxide application, a definite chemical reaction occurs leading to the bonding of the sand by means of a colloidal silica-gel. With carbon-dioxide hardened sands, Petrzela found that collapsibility was adequate for foundry usage, and suggests that this may be due to loss of strength of the silica gel on heating.

Recent foreign publications describing the use of the process on a production scale in foundries, indicate that these previous objections to sodium silicate may not be valid; thus, Schumacher[4] describes the widespread use of the process in a German iron and steel foundry. He used a proprietary binder based upon sodium silicate but containing also additions to improve the strength obtained and to assist the sand collapsibility, four to five per cent. of this binder was found adequate and 1 per cent. of an asphalt material was also added which it is claimed is beneficial to surface finish and sand collapsibility. On small cores, the surface finish was satisfactory without any coating and the normal types of water-based and volatile-based refractory dressings gave a good surface finish on heavy castings. No increased distortion of moulds and cores was observed and, in fact, it is claimed that the process gives considerably better dimensional accuracy when compared with conventional moulding methods.

Another interesting article[5] has been published in Germany on the use of the process in a light-metal foundry where it is stated that, using simply 4 per cent. of a proprietary binder without any other additions, sand collapsibility and casting finish compared very favourably with normal sand mixes; in this paper, comparisons are given between the carbon-dioxide process and conventional processes for producing various cores of complicated shape which show considerable savings, particularly in time, with the former method.

Syssoev[6] describes the use of the process in a Russian foundry for the hardening of large moulds; apart from ancillary advantages such as the reduction of fumes on drying, it is claimed that the process has resulted in a considerable increase in the yield of castings per unit area of working space with a very small capital outlay. Several other papers [7 8 9] have been published describing the use of the process on a production scale and mentioning numerous other advantages.

There is little doubt that the process cannot and should not be considered as the panacea of all foundry ills; however, the results of full-scale production trials have shown that the process has a wider and general sphere of application, but naturally the extent of the application probably cannot be ascertained for some time (Cf. the shell-moulding process). It is interesting to observe how the successful development of the process has shown clearly the value of the direct practical approach of certain foundrymen who have endeavoured to find what the process can do, as this has often been in contrast to many of the predictions which have been put forward and often based upon prejudice and rather erroneous observations.

* Paper presented to the Birmingham branch of the Institute of British Foundrymen, Mr. J. L. Francis presiding.

Carbon-dioxide Process

Advantages and Limitations

Although many of the advantages are immediately obvious, some can only be appreciated after the process has been used for some considerable time on a production scale. Therefore, it will be appreciated that the following list is not intended in any way to be comprehensive:—

(1) If a suitable composition binder is employed there is no necessity to stove the core or mould: this leads indirectly to a very large increase in the effective floor space of a foundry. In addition, the elimination of stoving, leads to several ancillary advantages, including the absence of obnoxious core-stove fumes, and any doubt as to whether the cores are under- or over-baked, etc.

(2) Since the cores and moulds are usually hardened either in the core box or with the pattern in position respectively, core carriers can be dispensed with and there is also a considerable reduction in the number of strengtheners and core irons required. Also, due to the high strength of the core, there is virtually no need to turn it out on to a machined plate.

(3) When the moulds and cores are hardened either with the pattern in position or in the core box, there can be no distortion such as may occur with conventionally-bonded sands either in the "green" state or during stoving. This, of course, leads to greater dimensional accuracy and means that cores no longer have to be rubbed down to fit into prints.

(4) There is considerably less danger of blowing. This is due to two reasons: first the volatile content of the binder is very low, and also sands bonded with the binder are of appreciably greater permeability than when bonded with conventional oil or resin binders. This low volatile-content leads to a marked reduction in fumes of an obnoxious nature during casting.

(5) Cores made with the binder and a suitable dry sand can be stored almost indefinitely in a normal foundry atmosphere.

(6) Since there is no longer any need to stove cores or moulds, transport costs can be greatly reduced, and there is a very marked reduction in the demands on cranes, etc. Thus, one foundry producing daily a batch of 20 five-cwt. castings found that they saved a total of 140 crane lifts; this figure of about a saving of 7 lifts per casting has been borne out in other foundries.

(7) There is a considerable increase in casting output from a given floor space. Also, the same production can be obtained with fewer moulding boxes, etc. One can see that it will be possible ultimately to produce castings by stacking book-type moulds into fixed divisions on the foundry floor.

(8) One very interesting advantage is that there appears to be a reduced incidence in scabs and hot tears in the process. This seems to be due to the plasticity of the sand at high temperatures so that it can yield under expansive stresses and under compressive stresses, and thus prevent the formation of scabs and hot tears respectively.

(9) Due to the high flowability of sands bonded with this material, cores and moulds may be prepared more rapidly and with less effort after a certain amount of experience has been gained; it would also appear that cores and moulds can be prepared by semi-skilled labour since there is no longer any need, as with conventional core-sands, to sprig the core carefully, vary the degree of packing, etc., and this naturally leads to rapidity in core making. The sand has been used on all normal moulding and core-making machines and it has been found possible to obtain rapid production methods by only slight modifications to existing equipment.

(10) This process makes it possible to use a unit sand in the foundry which, of course, is not possible in a jobbing foundry where it is often necessary to have high green-strength mixes when there is a danger of distortion.

(11) One of the most attractive features of the process is that it only involves a very small capital outlay for the introduction of the process into a foundry.

The actual value of these advantages to a particular foundry depends considerably on many variables such as the type of metal being cast, the size of casting being prepared, present limitations on output, and many local factors. However, the foregoing list covers most of the salient benefits of the process and these are generally applicable to foundries ranging from light-alloy to steel.

Present limitations of the process are listed as follow, but all of these are elaborated in further detail in the Paper; it is considered that none of these is an insuperable difficulty and that most of them can be overcome as the process is developed both in the laboratory and on the foundry floor.

(*a*) Sands mixed with waterglass-base binders do tend to air harden due to the presence of a small quantity of CO_2 in the atmosphere. However, this may be surmounted by either storing the sand in closed hoppers or alternatively covering it with a moist sack. If these precautions are taken, sands may be stored for lengthy periods; in fact, some foundries have continued the rather bad housekeeping practice of preparing sand mixes at the end of the week ready for use by the first shift on the following Monday morning.

(*b*) When the sand is hardened in the corebox or with the pattern in position, it is considerably more difficult to strip, particularly when there is a deep draw. In such cases coreboxes are preferably collapsible and patterns must have a generous taper. Much of this difficulty may be overcome by rapping the corebox or pattern while the sand is still "green" just prior to hardening.

It has been suggested that sands mixed with CO_2 setting binders actually expand on reaction with the gas. In fairly extensive experiments, the Author has been unable to detect any expansion, the sand appearing to be volume stable on hardening The reason for this suspected expansion has often been put forward when difficulty has been experienced with a particular pattern, but this may well be due to the sand keying into grooves or undercuts in the pattern or box; naturally any such undercuts and so forth should be filled in with plastic wood, etc. However, where this difficulty is persistent and does cause trouble, a new type of carbon-dioxide-type binder has been recently developed which imparts a high green-strength to the sand so that it may now be stripped in the green state and then hardened; the practical application of this new type of binder is discussed later.

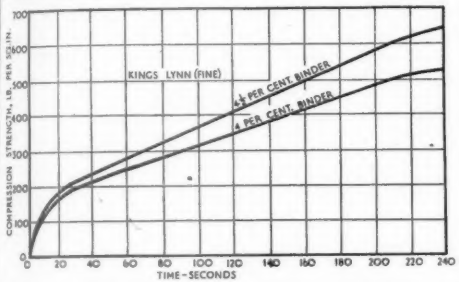

FIG. 1.—*Relation between the compression strength and the time of gassing with carbon dioxide for standard AFS compacts of (fine) Kings Lynn sand.*

(*c*) Difficulties have been experienced with freezing up of the valves used on the carbon-dioxide cylinders. This is solely a mechanical difficulty and has now been very nearly completely overcome by using various types of valves and cylinder systems.

It has been incorrectly suggested that this freezing-up is due to the presence of water in the carbon-dioxide gas. Most gases cool when expanded, that is, when passing from a high-pressure to a low-pressure zone through a small orifice. This cooling is particularly severe in the case of carbon dioxide and actually leads to the formation of solid carbon-dioxide in the valve.

Valve types have overcome this difficulty in two ways; either by having a double reduction stage which enables the gas to go to an intermediate pressure-zone, or alternatively, by incorporating an electric heater which counteracts the cooling of the gas. This latter type, of course, has the disadvantage that power points have to be available in the foundry. Extensions of the first type have been made whereby the gas from cylinders or from solid carbon-dioxide liquefiers is led into large reservoir tanks and stored there at pressures of about 100 lb. per sq. in. and these reservoir tanks can be connected to the air line in the foundry so that carbon dioxide is available at numerous points.

(*d*) The collapsibility of the sand when using high-temperature melts without any additions to the sand is inferior to that of conventionally bonded materials. However, as is discussed later in the Paper, satisfactory collapsibilty for most classes of work can be obtained when various materials are added in small percentages to the sand.

Finally, there is the question of sand reclamation upon which very little work has been done and which consequently cannot be considered as an advantage or disadvantage. The majority of the binder materials used are water soluble and preliminary practical trials of wet reclamation methods show that approximately 80 per cent. of the soluble binder material can be removed by a simple washing treatment. It seems that this wet reclamation

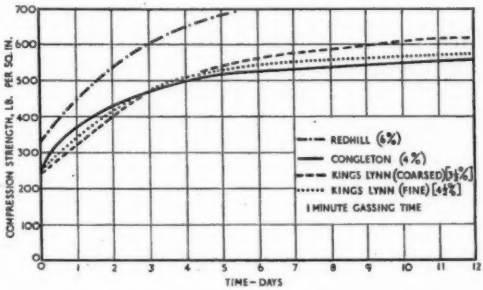

FIG. 2.—*Variation of compression strength of standard AFS compacts of a number of sands on standing.*

method will be comparatively cheap to employ on a production basis and the most costly item of the sand reclamation will be the drying of the wet sand.

Sands

Preparation of the sand mix follows much the same pattern as with conventional binders. During extensive foundry trials a wide variety of sand mills have been employed and all have been found to be satisfactory. The bond developed varies with different types of mixing equipment as is the case with oil and resin core-binders, and the milling time and technique should be adjusted to give the desirable properties for the application in view.

So far, silica, zircon and chamotte/silica sand mixes have been satisfactorily bonded with the appropriate binder developed by the Author's company. Although the following list cannot be considered as complete, the sands given below have all been found satisfactory:—

Southport, Congleton, Chelford, Leighton Buzzard, Kings Lynn, Erith, Aylesford, Redhill, and also a dozen local and foreign sands.

Hardened Strength

The desirable properties of any sand for use with the process are that it should be clean, dry, cold, free from clay and comparatively free from fines.

Carbon-dioxide Process

If such a sand is used then the optimum strength of the binder is obtained as illustrated by the following figures:—

Fig. 1 shows the relationship between compressive strength and casting time for a Kings Lynn sand; the most significant factor is the initial rapid rise in strength followed by a steady increase. As is discussed later, there is never any need to gas moulds or cores for the length of time shown in Fig. 1; it is both wasteful in gas and quite unnecessary. The actual quantity of gas required to react with a 4 per cent. addition of the proprietary binder is somewhere in the region of 0.4 to 0.5 per cent., but to obtain the initial set, smaller quantities in the region of 0.2 per cent. are required. It should be emphasized that after this initial set has been obtained, the cores and moulds are perfectly ready for casting. The introduction of this small quantity of gas into the sand leads to a partial reaction of the binder which increases so much in viscosity that it becomes virtually a semi-solid. After the initial set which is somewhere in the region of 200 to 300 lb. per sq. in. has taken

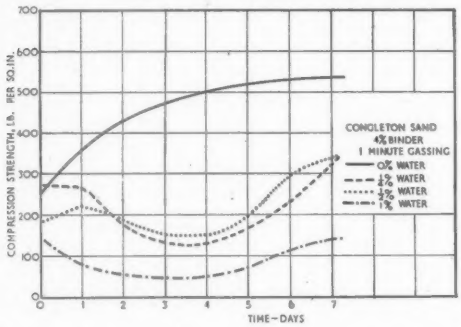

FIG. 3.—*Influence of moisture content on the compression strength of AFS compacts of Congleton sand, on standing.*

place in a matter of about 30 sec., further reaction of under-composed binder can take place either by passing more gas, or preferably by allowing the cores or moulds to stand in the atmosphere as shown in Fig. 2.

It may be seen that in a matter of a few hours there is a marked increase in strength followed by a falling off in the rate of increase, although it is significant that there is still a gain in strength even after 12 days; this curve tends to confirm the advantage claimed earlier with regard to core storage.

The results illustrated in Figs. 1 and 2 have been obtained with a suitable sand treated with the optimum binder addition, a point referred to later; when impurities are present, the shape of these curves can be markedly altered.

The presence of moisture in the sand has two serious disadvantages. Since the cores and moulds are not dried with this process, moisture in the sand may lead to blowing on casting. Of greater importance is the influence of small moisture-contents on the hardened strength of the sand (Fig. 3). It may be seen that although the initial set-strength of the sand is not appreciably reduced by the presence of moisture, the strengths deteriorate rapidly on standing, causing cores to become very friable. The picking up in strength of the moisture-containing sands after four to five days has not, as yet, been satisfactorily explained, but this phenomenon is of little practical significance.

Similar results are obtained with the presence of certain fine inorganic materials such as active clays in the sand. Fig. 4 shows the very detrimental effect of small quantities of bentonite, and similar results, although less severe, are obtained with clays of the ball and fireclay type. It is interesting to observe once again that the strengths do eventually begin to pick up after a period of several days.

The sands should definitely be cold; hot sand is not particularly detrimental to strength, but it does cause rapid air-hardening of the green sand and should be avoided for this reason.

Sand grading is of great importance in deter-

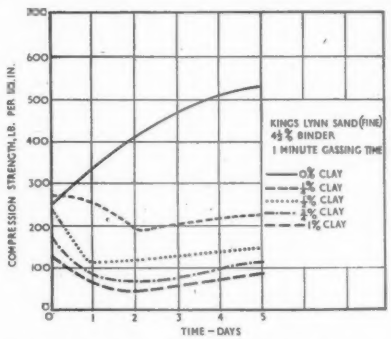

FIG. 4.—*Influence of clay content on the compression strength of AFS compacts of Kings Lynn (fine) sand, on standing.*

mining the hardened strength of the sand and its resistance to friability. A high percentage of fines in the sand tends to make cores and moulds friable unless high binder percentages are employed, such as 5 to 7 per cent., where with coarse sands optimum strengths are obtained with low binder precentages—2½ to 3 per cent. However, for the majority of core and moulding sands, a 4 per cent. addition of binder is about the optimum quantity.

(*To be continued*)

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London IBF Apprentice Competition

Enthusiastic Response from over 100 *Contestants drawn from* 40 *Foundries*

April 25 was "judgment day" in the Apprentice Competition organized this session by the London branch of the Institute of British Foundrymen. On that occasion, panels of assessors composed of prominent foundrymen drawn from as far afield as Newcastle-upon-Tyne adjudicated on competition castings made and submitted by over 100 foundry apprentices in the area served by the branch and its four sections. The item in question (the same for each contestant) was casting for a 2-in. valve selected from designs in normal production at A.P.V.-Paramount, Limited, Crawley, Sussex, but modified so as to pose a number of questions to the apprentice moulders. Apprentices entered the competition from about 40 foundries, from Baker Perkins in the north, to Thornycroft's in the south. Each one (see Fig. 1) had to make the casting in the metal of his choice from a new pattern and cores supplied to him. Prizes, certificates and diplomas were awarded in each of four groups: Steel, iron, copper-alloys and light-alloys.

Details of the awards, given in Table I, were announced at the annual general meeting of the branch on April 27, and the presentation of prizes and diplomas was made by the president Mr. W. Wilson, whose firm, Allied Ironfounders, Limited, had kindly donated prize-money. The enthusiasm engendered by the competition has left no doubt but that its worthwhile objective—that of encouraging foundry apprenticeship—has been well realized.

Organization

There is little doubt, also, that other branches of the Institute will wish to sponsor competitions in their own areas. For their benefit, the following notes on the arrangements for the competition in London are appended, though it must in fairness be pointed out that the London organizers themselves drew in no small measure on the experience of the Tees-side branch, where a similar competition was held last year—an event which was repeated this session.

The London competition was handled by a small sub-committee acting under the branch Council comprising Mr. W. Wilson (president), Mr. F. Hudson (senior vice-president), Mr. W. G. Mochrie (secretary), Mr. B. Levy, Mr. A. Talbot, Mr. J. F. B. Jackson and Mr. A. R. Parkes (sub-committee secretary). Plans for the competition were formulated and early in the session notices were sent to the 900-odd branch members inviting them to sponsor entries from their firms. Posters, too, were exhibited in foundries and technical colleges. The response was gratifying, but nearly overwhelming—in place of the 50 maximum expected, about 120 boys serving recognized apprenticeships in the industry applied to enter the competition!

Patterns

As it had been promised that a new pattern should be given to each competitor, the number entering immediately posed a major problem in patternmaking to the sub-committee, who had by then chosen a casting design for the competition. This design involved about 10 to 20 man/hours of work in the patternshop for each wooden pattern. It is recorded here to the pride and credit of the 40 firms whose apprentices had entered the competition that they "saved the day" by severally offering to make the 120 patterns free of charge, each according to capacity. Drawings were distributed in confidence and the wooden patterns—all in standard colours and markings—rolled into the central receiving depot—in this case, the basement of the FOUNDRY TRADE JOURNAL offices. In some cases as many as ten patterns were supplied, though the firm might have but one apprentice entered for the competition.

A second problem, that of cores, was solved by A.P.V.-Paramount, Limited (the foundry originally providing the casting design), who agreed to make all the necessary cores, and Mr. B. Levy who offered to furnish the coreboxes required. (Mr. Levy had already furnished a number of sample master patterns.) The cores comprised a simple 2-in. dia. main item and an optional lightening core of rather complex shape and somewhat fragile. These, too, were delivered in bulk to the JOURNAL offices and redistributed (in the week before the actual competition date) to the 40 firms. Here again the fragile nature of the cores posed a transport problem—once more, the firms came to the rescue and their own road transport arriving in London was routed to pick up cores, patterns and instructions. In some cases, also, one collecting firm distributed to foundries in its area, in other cases the services of foundrymen visiting London were roped in for transport. As a result of this help, all reached their destinations in time for the competition, and no complaints were received as to damage in transit.

Other Details

Each apprentice supervisor at the various works was provided with finished-part drawings, sets of instructions for the boys and rules for the conduct

* Patterns for the competition were furnished by the following firms: Ford Motor Company, Limited; A.P.V.-Paramount, Limited; C.V.A. Jigs, Moulds & Tools, Limited; Booth & Brookes, Limited; Allied Ironfounders, Limited; Baker Perkins, Limited; J. Hobkirk, Sons & Company, Limited; W. H. Allen, Sons & Company, Limited; St. Pancras Engineering Works, Limited; Western Foundries; B. Levy & Company (Patterns), Limited; J. Stone & Company (Charlton), Limited; Fraser & Chalmers Engineering Works; K. & L. Steelfounders & Engineers, Limited; Anti-Attrition Metal Company, Limited; J. & E. Hall, Limited; John I. Thornycroft & Company, Limited; High Duty Alloys, Limited; Qualcast (Ealing Park), Limited, and Lake & Elliot, Limited.

FIG. 1.—*One of the foundry apprentices at A.P.V.-Paramount, Limited, making the mould for his "competition casting."*

of the competition. Labels bearing a code number were supplied for each apprentice, with a tear-off portion for attachment to the casting and the body printed with questions on procedure to be answered by the competitor. To one of the questions—as to whether the pattern design was suitable—many apprentices were quite lengthy and painstaking in reply, even to the extent of sending supplementary written matter and sketches. It was in fact highly commendable the manner in which they tackled the job.

Only a light scratch brushing of the castings was permitted before they were sent, complete with all runners, risers, flash, etc., to the central receiving depot for judging. This rendezvous was the Battersea works of the Morgan Crucible Company, Limited, where Mr. J. H. Penfold of that firm's staff was most helpful in checking receipts, displaying the castings in groups for the judges measuring the yield ratios and so on. On April 25, the judges inspected all the castings here, subdivided as shown in Table I. The visitors were entertained to luncheon by the Morgan Crucible Company, along with members of the branch sub-committee. Each judge was provided with drawings, competition rules, a guide as to procedure and a marking table in which percentages against various features to be observed in the competition castings were indicated, plus an allowance for the age of the competitor. Such was the high standard of the entries, that decisions were in some cases extremely difficult, and many apprentices though not named among prize or diploma winners, acquitted themselves really well. In each case, judgment was unanimous among the panel—even in the case of steel castings, where Mr. Riley was supported by other judges experienced in steel casting (Figs. 2 and 3.

Judges' Comments

Copper-alloy Section

The general standard of entries was moderately good and a mark of 70 per cent. or over represented a reasonable saleable commercial casting (only about five fell below this standard). The variation in type of alloy made judging a little difficult, as the production of castings in the high-shrinkage alloys—aluminium-bronze, manganese-bronze and Monel metal—is so much more difficult

TABLE I.—*London Apprentice Competition Details and Awards.*

Section (Metal).	No. of entries.	Castings actually submitted.	Panel of judges.	Award.	Name.	Age.	Firm.
Steel	7	7	A. P. Riley	1st prize ..	J. Francis ..	18	Lake & Elliot, Ltd.
				Diploma ..	F. Edgar	20	R.O.F. (Woolwich).
Iron	52	51	J. Blakiston T. R. Twigger E. Longden	1st prize ..	W. Black ..	21	Gillett & Johnston.
				Diploma ..	J. H. Price ..	16	C.V.A. Jigs & Tools.
				Diploma ..	M. A. Cothill ..	19	J. Hobkirk & Co.
Copper-alloy ..	19	17	A. N. Wormleighton C. A. Timms	1st prize ..	J. A. Palmer ..	19	R.O.F. (Woolwich).
				Diploma ..	C. E. Rees ..	17	Langley Alloys, Ltd.
				Diploma ..	C. Neale	18	John I. Thornycroft.
Light-alloy ..	33	29	J. Vickers A. P. Fenn D. H. Potts	1st prize ..	D. V. James ..	18	Kent Alloys, Ltd.
				Diploma ..	R. Russell.. ..	18	J. Stone & Co. Ltd.
				Diploma ..	E. Coughlan ..	16	J. Stone & Co., Ltd.

Note: In each section the first prize was a superior type of wristlet watch, to be engraved on the back, together with a certificate. Diploma winners also received a copy of "Iron Moulding for Apprentices," the new book by F. D. Roper. Each book contained a signed replica of the Diploma and was itself autographed by the author.

FIG. 2.—*Judging in the steel section is Mr. A. P. Riley (right) (Darlington Forge, Limited) with Mr. D. H. Potts (left) (Westinghouse Brake & Signal Company, Limited) and Mr. J. Vickers (Daralum Castings, Limited) as spectators.*

technically. This was borne in mind in the marking.

The method of moulding varied from vertical to horizontal jointing and feeding by plaster-sleeve risers, pressure risering and runner/risers. The winning casting was in manganese-bronze and showed a very skilful runner system with dross traps sensibly placed, and a gradual increase of runner section as it approached the casting. The casting was exceptionally clean and free from moulding faults, such as cross-jointing, loose sand. All corners were perfectly sharp and well defined.

Other castings showed less attention to detail, but many were of a high general standard. All types of moulding methods were used, including two castings made by the CO_2 Process.

The times taken in moulding vary from 50 min. to 5½ hrs., and this feature was especially difficult to assess. In the judges' opinion, the optimum times would be:—Gunmetal 1½ hr.; manganese-bronze and aluminium-bronze 2 hr.; and Monel, 1¾ hr.

The age of the entrant was taken into account, and affected the results. One apprentice of 15 years did a very good job, and narrowly failed to secure a place. As a general comment, attention should be given to running techniques and greater efforts made to prevent dross formation in the aluminium-bronzes and manganese-bronzes. Several entrants went into the question of design thoroughly but did not apply their findings to any extent in the entry itself.

Cast-iron Section

Interest was taken in the many methods of gating and feeding and adaptions of pattern for vertical casting. In general, there was an excellent showing, particularly from young entrants. A large number of castings was rejected on account of disregard of runner entry-position in relation to machining, also the position of the riser in relation to the core. Excessive size of riser, too, was a cause for criticism in several cases, though the need for risers when casting high-shinkage iron was well kept in mind.

Light-alloy Section

The general standard of workmanship was very good, the winning entry produced in DTD 424 being an outstanding effort in simplicity of moulding technique to produce a sound casting with high yield.

The casting awarded the second prize—produced in magnesium alloy—clearly showed the apprentice possessed a good knowledge of the material characteristics and had, in the judges' opinion, a sound appreciation of the gating and feeding methods essential.

It was felt that many of the competitors who lost marks on the disposition of feeding heads would be well advised to study the basic principles of obtaining progressive solidification in a casting, this being particularly noticeable where competitors had placed feeding heads over the thinner section of the casting to the detriment of the soundness of the heavier end-section.

(*Continued on page 487, col. 2*)

FIG. 3.—*Mr. D. H. Potts, Mr. J. Vickers, and Mr. A. P. Fenn assessing competition castings in the light-alloy section.*

Institute Elects New Members

At the Council meeting held at York on April 16 the following were admitted to membership of the Institute of British Foundrymen in the grades indicated below:—

As Members:

F. Brown (Letchworth Castings Company, Limited, Letchworth); K. H. Dempsey (Iraqi State Railways, Baghdad, Iraq); J. Dohmen (Silverton Engineering & Motor Works (Pty), Limited, Silverton, South Africa); R. V. Dowle (Birmingham Aluminium Casting (1903) Company, Limited, Smethwick, Birmingham); R. Fulton (Wolsingham Steel Company, Limited, Bishop Auckland, Co. Durham); A. E. Hitchman (Crown Metal (Wednesbury), Limited, Wednesbury, Staffs); W. K. Hitchman (Crown Metal (Wednesbury), Limited, Wednesbury, Staffs); D. Hullock (Clay Cross Ironfoundries, Limited, Clay Cross, Derbys); G. A. Hunt (High Duty Alloys, Limited, Slough, Bucks); A. F. Kukla (Dunswart Iron & Steel Works, Limited, Benoni, South Africa); B. Langum (A/S Drammens Jernstoberi & Mek. Verksted, Drammen, Norway); W. R. E. Nice (Morgan Crucible Company, Limited, London); L. Ogle (G. C. Ogle & Sons, Limited, Ripley, Derby); R. J. Sarjant (British Steel Castings Research Association, Sheffield); T. Spencer (Foundry Equipment, Limited, Leighton Buzzard, Beds); S. Spray (Stanton Ironworks Company, Limited, nr. Nottingham); H. Steele (C. & J. Hampton, Limited, Sheffield); A. H. Sully (British Steel Castings Research Association, Sheffield); W. G. Thornton (Kirkpatrick, Limited, Walsall, Staffs); C. A. Timms (British Engines, Limited, Newcastle-upon-Tyne); C. Vaughan (Louis Cassier Company, Limited, London); G. Wilson (Sterling Foundry Specialities, Limited, Jarrow-on-Tyne).

Transfers from Associate Member to Member:

R. Carswell (Foundry & Engineering Products (Glasgow), Limited, Glasgow); T. Foley (Ford Motor Company, Limited, Dagenham, Essex); C. V. Rao (United Machinery Corporation, Bombay, India); G. A. Smith (K. & L. Steelfounders & Engineers, Limited, Letchworth); S. C. Worley (Wm. King, Limited, Birmingham).

As Associate Members:

G. G. Abraham (General Refractories, Limited, Middlesbrough, Yorks); P. V. Allen (Bagshawe & Company, Limited, Dunstable, Beds); R. Arinsu (asst. director, Teachers' Training College, Ankara, Turkey); J. E. Atkinson (Stanton Ironworks Company, Limited, nr. Nottingham); N. H. Baddeley (Jarrow Metal Industries, Limited, Jarrow-on-Tyne); E. Barnsley (Wm. Cook & Sons (Sheffield), Limited, Sheffield); S. Booth (S. Booth, master patternmakers, Baggrave Street, Leicester); R. S. Bowdidge (Ford Motor Company, Limited, Dagenham, Essex); N. Bradshaw (Metropolitan-Vickers Electrical Company, Limited, Manchester); D. R. Brookes (Paterson Hughes Engineering Company, Limited, Birmingham); E. O. Clarke (Gimson & Company, Leicester); W. Cooper (Qualter & Smith, Limited, Barnsley); F. Cudlip (Holman Brothers, Limited, Camborne, Cornwall); M. R. Dhingra (Northern Railway Signal Shops, Ghaziabad, Delhi, India); I. A. Dorning (Clayville Foundry (Pty), Limited, Olifantsfontein, Pretoria, South Africa); L. G. N. Edwards (Birlec, Limited, Birmingham); R. P. H. Fleming (Dexion, Limited, Kilburn, London); G. H. Goodere (Ministry of Supply, Kidbrooke, London); A. W. Gribble (W. H. Allen, Sons & Company, Limited, Bedford); L. A. Hamilton (Tubal Cain Foundry & Engineering Works, Limited, Cardiff); W. H. Hay (Singer Manufacturing Company, Limited, Clydebank, nr. Glasgow); H. O. C. Ikebaku (Vulcan Foundry, Limited, Newton-le-Willows, Lancs); K. A. Kazmi (H.M.P.S. Dockyard, Karachi, Pakistan); G. C. Lambert (Holroyd & Hall, Limited, Bradford); S. R. A. Langford (J. Stone & Company (Charlton), Limited, London); F. Lister (J. W. Jackman & Company, Limited, Manchester); T. Matty (Tyseley Metal Works, Limited, Birmingham); W. Maxwell (K. & L. Steelfounders & Engineers, Limited, Letchworth); J. G. McIntyre (E.A.R. & H'S., Dar-es-Salaam, East Africa); G. B. Parkin (British Foundry Units, Limited, Chesterfield); R. Parkinson (Lupton & Place, Limited, Burnley); J. Ramsden (B.S.A. Precision Casting Foundry, Redditch, Worcs); W. J. Robertson (Wm. Aske & Company, Halifax); W. H. Russell (Davy & United Roll Foundry, Limited, Haverton Hill, Co. Durham); D. E. Searle (Stanton Ironworks Company, Limited, nr. Nottingham); R. N. Sood (Government of India Diesel Engine Factory, Faridabad, India); J. Stronach (British Railways Workshops, Aberdeenshire); W. G. Teagle (Ventilating Equipment (Stockport), Limited, London, S.W.); J. H. P. Walsham (Harper, Phillips & Company, Limited, Grimsby); C. Watts (Distington Engineering Company, Limited, Workington, Cumb); D. White (Wm. Jessop & Sons, Limited, Sheffield); P. D. Webster (F. H. Bourner & Company, Limited, Crawley, Sussex).

Transfers from Associate to Associate Member:

J. H. Bhakta (Eastern Railway Workshops, West Bengal, India); T. H. L. Bond (Hill Top Foundry Company, Limited, Wednesbury, Staffs); J. B. Bell (Clyde Alloy Steel Company, Limited, Motherwell); A. J. Crook (Shaw Foundry Company, Willenhall, Staffs); G. Duckett (F. H. Lloyd & Company, Limited, Wednesbury, Staffs); R. G. Godding (British Cast Iron Research Association, Birmingham); J. M. Greenhill (Sterling Metals, Limited, Coventry); C. J. W. Hayhurst* (C. A. Parsons & Company, Limited, Newcastle-upon-Tyne); A. A. Jennison (Glow Worm Boilers, Limited, Milford, Derbys); G. C. B. Lamb (Ley's Malleable Castings Company, Limited, Derby); B. W. Locke† (De Havilland Engine Company, Limited, Edgware, Middlesex); M. Martin (British Cast Iron Research Association, Birmingham); E. Nelson (Harland & Wolff, Limited, Belfast); R. J. Patley (Dowson & Dobson, Limited, Johannesburg, South Africa); E. Player, Jnr. (Sterling Metals, Limited, Coventry); C. J. Ramsbottom (Steel Sales Company of Africa (Pty), Limited, Johannesburg, South Africa); E. Roberts (Langley Alloys, Limited, Slough, Bucks); R. J. Shelton (holder of the Worshipful Company of Founders' travelling fellowship).

Associates (over 21):

O. Barlow (Ley's Malleable Castings Company, Limited, Derby); G. J. A. Barritte (Alvis, Limited, Coventry); R. Brown (Jarrow Metal Industries, Limited, Jarrow-on-Tyne); D. J. Coleman (Vanderbijl Engineering Corporation, Limited, Transvaal, South Africa); D. Coulson (Jarrow Metal Industries, Limited, Jarrow-on-Tyne); P. F. Crisp (Foundry Equipment, Limited, Leighton Buzzard, Beds); K. Davies (Head, Wrightson Machine Company, Limited, Middlesbrough, Yorks); P. T. Holmes (chief engine room artificer, HMS

* With effect from June, 1955.
† With effect from May, 1955.

Institute Elects New Members

Dolphin, Gosport); T. W. Manuel (Noble & Lund, Limited, Felling-on-Tyne); W. Megson (Newton, Chambers & Company, Limited, Sheffield); R. G. Mellows (H. Wallwork & Company, Limited, Manchester); M. Muncaster (Alvis, Limited, Coventry); P. A. Neale (Fordath Engineering Company, Limited, West Bromwich); D. Porthouse (Jarrow Metal Industries, Limited, Jarrow-on-Tyne); W. R. Reeve (Ruston & Hornsby, Limited, Lincoln); C. R. Serrell (National Foundry College, Wolverhampton); G. B. Smith (C. & B. Smith, Limited, Wolverhampton); J. M. Sutherland (Davey, Paxman & Company, Limited, Colchester); H. R. G. Whyte (Loudon Works (S.M.T.), Johnstone, Renfrewshire).

Associates (under 21):

A. Agar (Consett Iron Company, Limited, Consett, Co. Durham); P. Atkinson (Ley's Malleable Castings Company, Limited, Derby); C. Bainbridge (Bristol Aeroplane Company, Limited, Bristol); J. K. Bather (Coneygre Foundry, Limited, Tipton, Staffs); Wm. Bryson (Mavor & Coulson, Limited, Glasgow); J. Burnett (Jarrow Metal Industries, Limited, Jarrow-on-Tyne); R. Cowen (C. A. Parsons & Company, Limited, Newcastle-upon-Tyne); J. D. Foreman (Dilworth & Carr, Limited, Preston, Lancs); J. Gaskell (Hattersleys (Ormskirk), Limited, Ormskirk, Lancs); E. Gibbons (Wear Winch & Foundry Company, Limited, Sunderland); D. Gleeson (Crockett, Lowe, Limited, Birmingham); R. Hastie (Clarke, Chapman & Company, Limited, Gateshead-on-Tyne); M. J. Hayward (Bristol Aeroplane Company, Limited, Bristol); J. S. James (Armstrong Whitworth (Metal Industries), Limited, Gateshead-on-Tyne); R. A. Jones (Consett Iron Company, Limited, Consett, Co. Durham); R. Kennedy (Clarke, Chapman & Company, Limited, Gateshead-on-Tyne); J. W. McKenna (C. A. Parsons & Company, Limited, Newcastle-upon-Tyne); C. Mellor (Hepworth & Grandage, Limited, Bradford); B. E. Mills (J. Stone & Company (Charlton), Limited, London); G. Nicholson (Jarrow Metal Industries, Limited, Jarrow-on-Tyne); G. Parker (Finch & Watson, Accrington, Lancs); V. Pescod (Clarke, Chapman & Company, Limited, Gateshead-on-Tyne); Wm. Ramsden (Consett Iron Company, Limited, Consett, Co. Durham); P. Rennolds (C. A. Parsons & Company, Limited, Newcastle-upon-Tyne); C. Rickeard (John I. Thornycroft & Company, Limited, Southampton); E. Ritchie (Wear Winch & Foundry Company, Limited, Sunderland); G. E. Sands (Consett Iron Company, Limited, Consett, Co. Durham); R. F. Tonkinson (Crockett Lowe, Limited, Birmingham); D. L. Wilkinson (Dilworth & Carr, Limited, Preston, Lancs); E. M. Worley (student, Downing College, Cambridge); G. Wylie (Jarrow Metal Industries, Limited, Jarrow-on-Tyne).

Impersonal Attitudes Deplored

The Yorkshire section of the Institution of Production Engineers held their annual dinner at the Hotel Metropole, Leeds, on April 23. Mr. W. M. Oddie, managing director, Spencer & Halstead, Limited, Ossett, proposing the toast of the Institution, emphasized the need for giving workers a fair share in the results of increasing mass production. He said that he regretted that the movement towards greater mass production was accompanied by an impersonal attitude towards the individual. Manufacturers could not expect workers to make the most of such methods and at the same time, ignore the spiritual and human problems involved. In a reference to the forthcoming conference of the Institution on the "Automatic Factory" he said he saw no reason why such factories should create unemployment.

London IBF Apprentice Competition

(*Continued from p.* 485)

Steel Section

The forethought and study given to the production of this casting was of a very high order. Some of the execution left something to be desired and a little more time spent would have paid dividends.

The winning entry was a first-class job, and only lost marks in connection with the feeding method chosen. A small densener in the hot-spot opposite the head with the Washburn core would have ensured soundness, although shrinkage defects, if they were present, would be where they do not matter.

Although the casting gaining second prize lost a lot of marks for yield and time taken, the fundamental principles employed were good and therefore gained marks. There was nothing between the castings judged third and fourth, but, considering they were made in stainless steel, the surface finish could have been better. The fifth competitor had good ideas, particularly in the use of nails for chilling, but the position of attachment of the main head was too high, and the underside of the casting would not be fed adequately. The last entrant had let his ideas overcome his better judgment, to the detriment of sound production, and had therefore fallen between two stools. In all, a very creditable effort was made by the apprentices, and it would appear that they are being well instructed.

After the assessment of the castings and the judges had delivered their verdict, the party was entertained to dinner at the Waldorf Hotel, Mr. F. Hudson being the host. Here full tribute was paid to their selfless enthusiasm in coming so far, no doubt at great personal inconvenience and expense, to help in making a success of the competition.

At the Wednesday meeting of the branch, a short description of the competition was given by Mr. F. Hudson, who also read the judges' comments from each section. All the castings which had gained awards were on view and slides were shown of those securing first prize in the four sections; Mr. Hudson briefly commenting on the salient features of each.

Though it is anticipated that other branches will wish to emulate this feature of the London branch's programme, it is certainly not a proposition to undertake lightly. Quite apart from the not inconsiderable office work entailed within the branch, and time devoted by officials, it is estimated that the total cost to the London founders, if it could be aggregated, might well run to four figures. That this expenditure was so willingly accepted and such astonishing enthusiasm engendered everywhere is a fine tribute to the progressiveness of the industry and the interest it is taking in fostering the retention of craftsmen's skill.

THOMPSON BROS. (BILSTON), LIMITED—Mr. A. E. P. Turner has been appointed a director and secretary. The latter position is being relinquished by Mr. H. Sargent.

BIF Briefs

The British Industries Fair, currently being held at Birmingham and Olympia, is open to trade buyers from 9.30 a.m. to 6 p.m. daily and to the general public from 2 p.m. and all day Saturday, May 7. The Fair closes on May 13 at 4 p.m. Below is a further selection of brief descriptions of stands at Birmingham which are of interest to foundrymen:—

BAKELITE, LIMITED (C404/505) include grades of plastics for foundry shell moulds and cores amongst the wide range of thermosetting and thermoplastic moulding materials, laminates, extrusion materials, resins and adhesives.

CUXSON, GERRARD & COMPANY, LIMITED, Oldbury, Birmingham, specialize in industrial first-aid, and their stand No. B516 in the Birmingham section is equipped as a typical works first-aid room. The most up-to-date first-aid treatments and methods will all be on display, and their 136-page catalogue summarizes industrial first-aid regulations and quotes useful advice on first-aid organization.

AMONG WEIGHING MACHINES exhibited by Ashworth Ross & Company, Limited, are:—Type 213A portable platform weighing machine model (capacity 5 cwt.); type 7314A self-indicating machine; type 6115 self-indicating bench dial machine; type 1/7213A portable platform; type 2/7213A model, commonly referred to as the automatic cut-off machine and one multi-change cabinet dial indicator, electrically operated.

F. E. WEATHERILL, LIMITED, Welwyn Garden City, Herts, are currently exhibiting at Castle Bromwich no fewer than six different types of loading shovels on outdoor stands Nos. 1108 and 1209, and these, together with the 2H model, will include a new 3-cub. yd. capacity 6HL hydraulic coke loader with which is offered a readily interchangeable scoop of 1½ cub. yd. to enable the machine to be used for heavier materials as well. Another new machine also being exhibited for the first time is the 4HTW, a hydraulically operated overloader combining forward or rear scoop discharge.

On Stand D.305/204 (Castle Bromwich) the Yale & Towne Manufacturing Company, of Wolverhampton, are displaying materials-handling equipment. The exhibits include ball-bearing hoists and electric hoists with a single-phase motor available as an alternative to the three-phase model. Exhibited for the first time are new hydraulic hand-lift trucks—pallet and platform; both in 4,000 lb. and 6,000 lb. capacities. Important features include fully protected hydraulic unit; multistroke lifting action; variable lowering speed; pedal control for right- and left-footed operation; and self-aligning wheels which ensure constant four-point ground contact.

COLT VENTILATION, LIMITED, Surbiton, Surrey, have two stands at Castle Bromwich. Stand No. B.506 features one of the latest and largest of industrial ventilators. This new ventilator, which is 24 ft. long by 6½ ft. wide, is designed to afford the rapid release of process heat in a large building by opening up an area of over 150 sq. ft. of roof to the sky without interference by the elements, and is operated by a system of motorized controls. Stand No. C.732 is devoted to the "two-way" window fan, which extracts foul air at one and the same time as it draws in fresh air replacement (filtered, if desired, by means of a simple attachment).

FOUNDRY EQUIPMENT, LIMITED, on stand D.301/200 include demonstrations from the following machines:—S.P. 1300, a shell-core and shell-mould blower; S.P. 10, double-station de-luxe shell-moulding machine; S.P. 110, a high-speed automatic combination coreblower with rollover and stripping machine—transfer, lift-up and pushout devices; the C.S.M. 3, core-sand mixer; J.P.M. 1, automatic jolt-squeeze pneumatic moulding machine; H.E.B. 1, Hydroil-electric high-speed boxless moulding machine; a "Junior" sandrammer, complete with integral feed unit and vertical skip-loader; size 4 ft. by 3 ft. F.E.-Matic electro-vibratory knockout; and the model B.M.O., batch sand mill.

THE DEVILBISS AEROGRAPH Stand (D405) at Castle Bromwich, display a comprehensive range of spray finishing equipment. There is an automatic transverse spray coating machine, ideal for the quick and efficient finishing of almost any article that is mass produced, a water-wash spray-booth in which air exhausted from the finishing shop is washed clean of enamel frit, thereby eliminating any risk of outside air pollution in closely built-up areas. A typical circulating material feed system shows the modern method of supplying material to spray guns in factories where finishing is done on a very large scale. Other exhibits include stationary and portable air compressors, air transformers, pressure feed tanks and spray guns.

IN THE manufacturers' side of the battle against smog, Radiation, Limited (Stratford Place, London, W. 1.), stand B501/400, are offering a range of solid-fuel-fired cookers, room and water heaters at the BIF which are made to burn smokeless fuels, such as coke, efficiently, as well as coal. Most are fitted with built-in gas ignition, others can lit smokelessly with a gas poker. Shown for the first time at the Fair is the new thermostatically controlled "Nautilus 55" coke boiler—the thermostat providing variable control. Another "live" appliance being exhibited is the firm's smokeless "whole-house warming" system, demonstrated at Castle Bromwich by an oil-fired space and water heater. For the first time, a back-access-panel is shown which facilitates, through a grille, the convection of heat from a living room fire to an adjoining room or passage.

AMONG the founders showing at the Fair, Castings, Limited, malleable ironfounders, of Walsall, are using the theme: "Quality creates Demand." They emphasize that over the last four years rejects from customers have been fewer than three per 1,000 castings delivered and that this has been achieved by quality and technical control. That the firm's reputation has increased the demand for the products is being shown on the main display table by a scale model of the foundry as it existed 30 years ago (with typical products of the saddlery trade) followed by the model of the present foundry and then the future Brownhills foundry as it is expected to look, for an output of 100 to 150 tons per week. Also on show is a typical range of castings produced to-day (some finished machined), and the firm's weldable and pearlitic malleable irons are publicized.

More Russian Pig-iron for Belgium

Licences for the import of a further 30,000 tons of pig-iron from Russia are being issued by the Belgian Government with the assent of the High Authority of the European Coal and Steel Community. This means that since the beginning of the year 100,000 tons will have been imported from Russia.

Allocations of imported scrap announced by the Joint Office of Scrap Consumers, which has apportioned 125,000 tons to Italy, 80,000 tons to Western Germany, and 25,000 tons to France, do not include Belgium.

Association of Bronze and Brass Founders

Twelfth Annual General Meeting, London, April 26

The president, Mr. Alfred F. Rayner, took the Chair at the annual general meeting of the Association of Bronze and Brass Founders which was held last week at the Connaught Rooms, London, W.C.2. During the past year, there have been no resignations and the following firms have become members:—Brentford Foundries, Limited, Brentford; Cousens & Johnson, Batley; J. G. Statter & Company, Limited, Amersham; M. W. Swinburne & Company, Limited, Wallsend-on-Tyne; C. G. Thornton, Limited, Birmingham; and Taylor's Foundries, Limited, Wembley.

President's Report

The president then submitted his Report, in the course of which he said:—

Since the last general meeting, four normal meetings and one emergency meeting of the Council have been held at which I have been happy to preside. The meetings have been well attended and all subjects raised have been discussed thoroughly. Our many activities have been as follow:—

Conditional Aid

We have now had 12 months' experience of the Advisory Service scheme which has progressed far more satisfactorily than many members anticipated. Advice is being given on a variety of subjects and there has been a willingness by the recipients to pay reasonable fees. As evidence of the interest which is taken by members, and others, in modern developments, at least 425 copies of Mr. Rice's report on shell moulding have already been sold and distributed by this Association, in addition to the distribution made by the British Non-Ferrous Metals Research Association—of the order of 250. Advisory Service meetings have been held in all parts of the country during the year, and it is particularly pleasing to note the interest in the Newcastle-upon-Tyne area.

I greatly appreciate the work done by the area chairmen and committees as well as those who have acted in an advisory capacity. Negotiations are almost completed with the BNFMRA for further co-operation both on shell moulding and in other fields. I hope that members will continue to make use of the Advisory Service scheme and emphasize that further applications will be welcomed.

Research Group

The request of the BNFMRA for increased income, which was addressed to all their members, was generously met by members of the Research Group in agreeing to increase their contributions by £10 per member per annum. We look now to the Research Association for results which will justify increased contributions made by members of the Group and which will encourage other members to join the Group. It is recognized that research is important to the industry and that the work of the Research Association strengthens the work of the trade association.

Safety, Health and Welfare

The ABBF actively participates in the work being done by the advisory committee on safety, health and welfare in non-ferrous foundries. Mr. G. T. Hyslop is a member of the sub-committee and is working on the "Garrett Report" to produce a similar report applicable to non-ferrous foundries. This work is essential to the welfare of the industry if it is to keep its labour force and live down the bad reputation which is its legacy. Many foundries have been rebuilt and improved, so that the working conditions are excellent. Whilst it is a duty to see that bad conditions are overcome, the Association is fully aware that regulations must be practical and reasonable and no effort will be spared to this end.

Copper Prices

The enormous advance in the price of copper which has taken place in the last few months was considered most harmful to our industry, and members of the council, together with representatives of the British Bronze and Brass Ingot Manufacturers, met the assistant secretary of the Board of Trade and officials of the Ministry of Supply, and put forward suggestions which would ease the position in regard to copper prices and supplies. Helpful talks took place and the recent release of Government copper, and the subsequent fall in price was in no small way due to the representations put forward.

Technical Committee

Mr. R. Lancaster will report later on the work of the Association's Technical Committee. The Council is fully informed and appreciative of the work being done by that Committee; one of their many preoccupations at the present time is revising the British Standard Specification 1400. The care the Technical Committee is taking to keep the specifications realistic is very noticeable.

Publicity

An attractive folder designed to interest non-member firms has been produced by a few enthusiastic members. Copies have been sent out by the secretaries and members could well reinforce this effort by taking copies and handing them to non-member firms known to them, with a little sales talk on behalf of the Association.

Membership

The total membership of the Association has increased during the year and is now 107; it is particularly pleasing that there have been no resig-

nations. With the enthusiasm and help of members, the number should grow from year to year.

British Productivity Council

The British Productivity Council have produced a report on the brassfounding industry which is, in effect, a follow-up on the Brassfoundry Productivity Report. The ABBF was permitted to criticize a draft of this report which, while acknowledging a progressive section of the industry, draws attention to the reactionary section. It is regrettable that this exists and perhaps that it gets publicity. I can only urge that the influence of this Association be so extended that it permeates through the whole industry and brings the backward sections up to date.

Code of Inspection Procedure

The happy relationship with the Ministry of Supply inspectorates, which made possible the production of the Code of Inspection was referred to by the president in his report last year. It is interesting to learn that nearly 900 copies of the code have been sold.

Bulletin

A year ago, Mr. W. R. Buxton kindly assumed responsibility of the editorship of the Association's *Bulletin*. This quarterly publication is of great value and maintains the standard set by Mr. Smithson. The new feature—that of graphs of metal prices—is of particular interest.

Rating

The Association's Council has supported opposition to de-rating of premises without a revision of the whole rating system being undertaken. Members have also been advised of action which may be taken when new assessments are raised on their premises.

Finance

The accounts for the year show an improvement in that there is a slight excess income over expenditure. The best solution to the financial problem is greater income accruing from increased membership.

Social Function

The theatre party has been held again this year and suggestions have been made and considered for changes in the present form. The theatre party preceded by a cocktail party and followed by dinner and dancing is very popular and the informal atmosphere seems to be specially appreciated.

Appreciation

In completing my year of office, I cannot let the occasion pass without reference to the unstinted and most loyal support of the members of the Council during the period I have been in the chair. They have been most helpful and ever willing to share the burden of the many problems that have arisen and been dealt with during a somewhat strenuous year.

My appreciation is specially due to the chairman and members of the Technical Committee for their boundless energy in dealing with the many and various technical items connected with our industry. Thanks are due also to the chairman and area chairman of the Conditional-Aid advisory committees, for their energetic and forceful perseverance in connection with the many meetings held all over the country, which has given considerable prestige and publicity to our Association.

I must also refer, as it has so often been done before, to the immense help received from the secretaries, whose unfailing and courteous help has always been forthcoming, and it is felt all will agree that the Association is in safe and efficient hands in entrusting the secretarial work to Heathcote & Coleman, and I give individual thanks to both Mr. Cleaver and Mr. Rogers.

Gentlemen, I thank you for the confidence you placed in me, I have thoroughly enjoyed my year of office, and it has been a great experience. I have given of my best, and I hope you have not been disappointed.

Technical Report

Mr. R. Lancaster then presented his report, as chairman of the Technical Committee, in the following terms:—

The Technical Committee has held four meetings as usual during the past year; an unusually heavy burden has, however, been borne by members of the committee due to the work which has been necessary in connection with the Advisory Service scheme, the revision of BS 1400, the completion of the Code of Procedure for Inspection and attendance at various committee meetings dealing with other subjects.

Membership

The Committee have had pleasure in welcoming Mr. E. Ayres, of Millspaugh, Limited, to the committee and members may be sure he will be a source of strength and wisdom. On the other hand, it records with much regret the loss of the services of Mr. Frank Hudson who, due to other commitments, has had to curtail some of his activities.

Liaison with the Institute of British Foundrymen

The resignation of Mr. Frank Hudson has brought to the fore the question of liaison with the Institute of British Foundrymen. It is obviously highly desirable that the work done by that body and the ABBF should be complementary and that efforts should be closely co-ordinated. ABBF members serve on IBF committees dealing with non-ferrous subjects, and for these reasons the Association would welcome some form of representation on their programme-forming committees, both to reinforce the non-ferrous point of view and to ensure that terms of reference take into account the Association's special considerations.

BS 1400 *Revision*

A great deal of work has been done on the proposals for revision of this British Standard. The matter is being considered by a working party on which the Association is represented by Mr. A. R.

French. All points arising have been carefully considered by the Technical Committee; aspects so far dealt with are layout, chemical composition, ultimate tensile strength and elongation. There has been close liaison throughout this revision with the British Bronze and Brass Ingot Makers' Association, and agreement has been reached with that body on the proposed alterations to the various specifications.

Alterations have been made in chemical compositions in some cases, principally in the brasses, in the phosphorus content of the phosphor-bronzes, and the zinc in gunmetals. These alterations have only been suggested after consultation with members concerned with these alloys and they should be generally acceptable. Similarly, with the ultimate tensile strength and elongation, alterations have been made so that these figures are nearer to those obtainable, but here again the alterations have been limited as it is felt wise to move cautiously in the matter. Consideration has also been given to 0.1 per cent. proof-stress values which are included for information, and members' views have been requested on the desirability of giving hardness values.

While the BS 1400 schedule is primarily for the purpose of inspection, the Committee is conscious of the need to provide the designer with information as to the properties which he may expect to find in castings and it has under consideration a recommendation for a companion volume to the schedule which will contain data given for information. The revised schedule, which is available in draft form will be circulated to members for comment, in the meantime members are advised of developments both at area meetings and in the Association's *Bulletin* and the Committee is always glad to have their comments.

Code of Inspection Procedure

A year ago, the Association reached full agreement with the Ministry of Supply inspectorates on the "Code of Procedure for the Inspection of Copper-base Alloy Castings" which came into effect on September 1, 1954. The conclusion of this code was a remarkable achievement which the committee is happy to know is being followed by similar action on the part of other branches of the foundry industry. The Code will come up for revision later in the year and the committee look forward to continuing the good relationship which has been established with the Ministry of Supply inspectorates.

Safety, Health and Welfare

The Technical Committee has been happy to co-operate with Mr. G. T. Hyslop in providing, as far as they can, information on subjects which are being discussed in HM Chief Inspector of Factories advisory committee.

Tolerances on Castings

The Committee has been pressed from one quarter recently to make a statement on the tolerances which may be expected on castings made by various methods. Careful consideration has been given to the request, but so many variables are involved that it does not feel it is desirable to make a statement which would be hedged around with so many qualifications as to make it useless; in their opinion the subject of tolerances is one which must be settled between the buyer and the founder.

Appreciations

The members of the Committee have given valuable and willing service on both main and other minor questions which have been received during the course of the year; the writer very much appreciates this and thanks them for the support which they have thus given. Thanks are also accorded to the secretaries for the great assistance they have given to the Technical Committee throughout the year. Not only has Mr. Rogers carried out his duties at the Technical Committee meetings with his usual quiet efficiency, but has rendered valuable assistance on other occasions when special meetings have been called. The Technical Committee has completed another year of solid endeavour, of which it must be justly proud.

Advisory Committee

Mr. W. T. Hobkirk, as chairman of the main advisory committee, gave the following report of its activities:—

During the year the main Advisory Committee has met on five occasions and there have been 22 meetings in various areas of the country, at which a total of 350 firms were presented; 217 of these not members of the Association, a total of 568 individuals attending. There have been some 19 applications for advice and, although some of these were not such as could come within the scope of the service, visits have been made, help given and the agreed fees paid. The subjects which have been dealt with by the advisers are:—Foundry layout; centrifugal casting; shell moulding; porosity; foundry and production problems.

The work which has been sponsored by the Advisory Service in connection with shell moulding has been an undoubted success and has engendered interest far and wide. The Advisory Service made itself responsible for 500 copies of the report on shell moulding, the demand for which continues. This, of course, is in addition to any supplies which have been issued by the BNFMRA. As stated already, meetings have been held in various areas of the country with varying success, and it would be of the greatest help to the main Advisory Committee if members in their areas would bring forward suggestions of items of particular interest in their own locality.

Future Policy

It is the policy of the main Advisory Committee to continue to engender interest in productivity generally, but it can only do so with success if it receives the support of founders all over the country. Arrangements have been made with the BNFMRA for continued activity in connection with shell moulding and the chairman for one looks forward to a further report from Mr. Rice on this subject. In addition thereto, the main Advisory

(Continued on page 492 at foot of col. 2.)

Flaw-detection in Wire Ropes

While it is comparatively easy to recognize external wear on wire ropes caused by friction of pulleys, guides, etc., and obtain from this an approximate estimate of the degree to which it is worn, possible damage to internal wires may be undetected, as well as any corrosion which might have taken place or possible wear caused by friction between two adjoining layers. Although inductive apparatus to detect interior defects on wire ropes was already known to be in existence before the war, results produced were inadequate and did not justify its application in practice.

Some years ago Integra of Wallisellen, located near Zurich, who specialize in railway signalling installations, according to the "South African Mining and Engineering Journal," January 29, were called in by the Federal Office of Transports at Berne to develop an apparatus for them which would give the results required. After many experiments, they evolved a unit which is called the "Tyer-Integra" wire-rope crack-detector, which comprises three parts, the detector, the recorder and the amplifier; the first two may be sited away from the wire rope and connected with the detector by cables.

The detector consists of a 40-cm. dia. solenoid approximately 40 cm. long, self-centring round the wire rope; it has three layers of wire of several mm. diameter. The solenoid is fed by d.c. power supplied by an accumulator battery, which generates in the wire rope a constant magnetic flux directed along its axle. The solenoid forms the exciting coil. In the centre of this large exciting coil are two small measuring coils with an overall thickness of 5 mm. These small coils are set at 90 deg. The coils are connected to the amplifier by flexible cables.

Assembly

The whole assembly, consisting of coils and a guiding tube for the wire rope, is contained in a watertight case made in two halves to enable the apparatus to be placed around the wire rope as it is impossible to feed the wire rope into the apparatus because the ends are connected. Consequently, each of the coil windings consists of two half-windings which are connected by plug-in contacts. The detector may be moved along the wire ropes or the wire rope within the detector.

The sections which are in normal working condition will have the same magnetic resistance (reluctance) all the time the detector is moved along the wire rope and the flux in the small coils will not vary; but as soon as any section shows an irregularity (broken or deteriorated wire) the reluctance changes, the magnetic flux varies and current is induced in the small coils. This current will be amplified by the amplifier and registered by the recorder. From successive oscillograms of tests on wire ropes, it is claimed that data may be obtained clearly demonstrating the history of a particular wire rope.

Coal and Coke Prices Rise

Increases have been made in the retail prices of coal in the provinces and of gas coke throughout Britain, except in the north-west, due to higher costs of distribution. The coal price rises range from 3d. a ton in the west to 1s. 11d. a ton in the north-east. The retail prices of coal in the London area are unchanged.

The price of gas coke has been raised, except in the north-west, by from 8d. to 2s. 4d. a ton, and in the Greater London Area from £6 8s. 2d. to £6 9s. 10d.

British and World Shipbuilding

Lloyd's Return for March Quarter

Lloyd's Register of shipbuilding returns relating to merchant ships of 100 tons gross and upwards, for the quarter ended March, 1955, shows that in Great Britain and Northern Ireland at that date, steamships and motorships under construction totalled 335 ships of 2,144,146 gross tons, compared with 327 ships of 2,140,752 tons in the previous quarter. The total includes 124 steamers of 1,282,525 tons and 211 motorships of 861,621 tons.

In the remainder of the Commonwealth 51 ships of 129,640 tons were under construction, compared with 44 ships of 117,181 tons in the December quarter, these vessels including 16 steamers of 32,614 tons and 35 motorships of 97,026 tons. Oil tankers of 1,000 tons and upwards building in Great Britain and Northern Ireland totalled 86 ships of 1,104,368 tons compared with 83 ships of 1,123,008 tons in the December quarter, and representing 51.5 per cent. of the total tonnage under construction in this country. World figures of ships being built totalled 283 steamers of 2,701,342 tons and 989 motorships of 3,261,330 tons, making a total of 1,276 ships of 5,963,187 tons (including a few small wooden vessels), compared with 1,169 ships of 5,854,247 tons in the previous quarter. Ships under construction in the principal districts of Great Britain and Northern Ireland are shown in Table I.

TABLE I.—*Ships Under Construction in Principal Districts of Great Britain and Northern Ireland.*

District.	March 31, 1955.		December 31, 1954.		March 31, 1954.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Aberdeen ..	17	27,455	17	23,429	17	27,182
Barrow ..	5	107,140	5	107,140	5	85,120
Belfast	17	211,250	20	248,780	16	204,760
Bristol	4	2,070	6	3,160	7	4,620
Clyde—						
Glasgow ..	72	465,684	67	488,609	87	564,841
Greenock ..	33	215,710	27	191,430	34	228,297
Dundee.. ..	6	34,610	5	30,300	6	43,150
Hartlepool ..	7	39,884	6	35,596	9	55,519
Hull	31	16,618	30	14,357	22	11,785
Leith	15	49,560	13	40,270	13	36,000
Liverpool ..	20	150,768	18	133,798	16	148,201
Middlesbrough..	15	196,050	16	203,900	15	204,044
Newcastle-upon-Tyne ..	39	399,330	38	376,195	35	332,148
Southampton ..	4	2,084	5	6,584	5	6,574
Sunderland ..	27	212,790	30	226,765	30	220,980

Association of Bronze and Brass Founders

(Continued from page 491.)

Committee has obtained the approval of the Board of Trade to the promotion of research in connection with the CO_2 process on the same lines as those adopted in connection with shell moulding. It is felt that the interest of the brassfoundry industry in general will be best served in this way.

Election of Officers

During the "business" section of the annual meeting, the following officers were chosen for the ensuing year: Mr. W. T. Hobkirk (J. Hobkirk, Sons & Company, Limited) was elected president, and Mr. P. B. Higgins (Yorkshire Engineering Supplies, Limited) vice-president. A new member elected to the Council was Mr. E. Ayres (Millspaugh Limited).

Imports and Exports of Iron and Steel in March

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in March. Totals for the first quarter of this year and last are also included.

Total Exports of Iron and Steel

Destination.	Month ended March 31.	Three months ended March 31.	
	1955.	1954.	1955.
	Tons.	Tons.	Tons.
Channel Islands	582	1,166	1,969
Cyprus	715	1,082	1,358
Sierra Leone	893	4,441	2,013
Gold Coast	2,725	10,601	7,529
Nigeria	3,096	15,081	10,617
Union of South Africa	6,490	10,041	23,882
Rhodesia and Nyasaland	12,038	11,399	19,151
Tanganyika	1,472	2,821	3,566
Kenya	10,258	17,062	16,358
Uganda	395	2,162	1,379
Mauritius	335	2,384	672
Bahrein, Qater, and Trucial Oman	1,741	8,836	3,266
Kuwait	421	2,898	1,185
India	16,143	24,311	39,466
Pakistan	1,947	12,421	17,578
Singapore	2,601	8,891	10,682
Malaya	1,818	6,100	4,708
Ceylon	2,463	4,010	5,646
British North Borneo	317	1,054	849
Hongkong	5,595	4,559	12,722
Australia	47,175	48,933	130,492
New Zealand	26,116	42,944	73,256
Canada	7,372	40,760	21,038
Jamaica	512	3,643	2,881
Trinidad	5,403	11,335	16,326
British Guiana	920	1,185	1,677
Anglo-Egyptian Sudan	2,608	9,312	5,537
Other Commonwealth countries	3,483	7,108	10,133
Eire	6,154	11,556	14,759
Finland	6,415	13,043	20,649
Sweden	10,124	21,236	36,296
Norway	13,834	20,798	34,378
Denmark	6,558	23,188	22,801
Western Germany	626	1,572	2,242
Netherlands	9,884	25,790	29,067
Belgium	1,549	3,023	5,291
France	928	1,299	1,912
Switzerland	1,387	2,485	4,130
Portugal	1,611	2,792	3,198
Spain	11,966	736	13,498
Italy	2,533	11,328	6,744
Austria	187	220	595
Yugoslavia	1,291	1,140	4,960
Turkey	93	1,824	2,422
Netherlands Antilles	2,229	1,222	3,268
Portuguese E. Africa	96	609	416
Lebanon	163	501	255
Israel	975	3,731	2,964
Egypt	2,460	9,445	10,773
Saudi Arabia	817	591	3,061
Iraq	3,869	8,029	6,685
Iran	5,352	1,351	13,524
Burma	2,048	2,210	4,031
Thailand	412	1,595	1,514
Indonesia	610	1,643	1,083
Philippine Republic	95	857	1,063
USA	3,315	6,968	11,210
Colombia	764	1,912	2,554
Venezuela	6,060	8,453	21,252
Ecuador	187	826	759
Peru	777	863	2,427
Chile	126	323	374
Uruguay	1,144	4,694	3,120
Argentina	9,148	19,033	16,914
Other foreign countries	3,426	15,617	12,567
TOTAL	284,847	549,043	768,692

Total Imports of Iron and Steel

From	Month ended March 31.	Three months ended March 31.	
	1955.	1954.	1955.
	Tons.	Tons.	Tons.
Australia	1	5,998	7
Canada	3,385	248	13,086
Other Commonwealth countries and Eire	708	1,392	1,476
Soviet Union	16,617	37,493	43,671
Sweden	3,017	10,912	7,837
Norway	6,413	5,756	18,933
Western Germany	2,971	36,261	5,466
Netherlands	16,075	28,889	31,898
Belgium	9,203	17,358	21,026
Luxembourg	2,678	7,515	6,485
France	18,648	25,613	30,651
Italy	5	2,663	72
Austria	11,938	72,168	35,992
Japan	98	15	1,257
USA	81,035	28,142	138,673
Other foreign countries	43	129	110
TOTAL	172,835	280,552	356,640
Iron and steel scrap and waste, fit only for the recovery of metal	92,957	215,776	277,694

Exports of Iron and Steel, by Product

Product.	Month ended March 31.	Three months ended March 31.	
	1955.	1954.	1955.
	Tons.	Tons.	Tons.
Pig-iron	5,558	2,551	15,698
Ferro-columbium (niobium)*	2	—	37
Ferro-tungsten	100	72	140
Other ferro-alloys†	277	1,167	659
Ingots, blooms, billets, slabs, sheet and tinplate bars	1,129	1,187	2,435
Iron bars, rods, angles, shapes, and sections	512	639	1,229
Steel bars, rods, angles, sections, and shapes	43,126	68,580	123,736
Iron plates and sheets	9	278	36
Universal plates	2,097	1,950	3,101
Steel plates, ⅛ in. and under ¼ in.	2,384	2,614	5,193
Do. ¼ in. and over	21,600	37,226	75,629
Black sheets and black plate	23,664	52,145	64,601
Hoop and strip	12,925	26,042	33,813
Tinplate	32,060	74,015	87,789
Tinned sheets, terneplate, and ternesheets	345	673	717
Decorated tinplate	126	705	782
Galvanized sheets	16,782	41,393	43,365
Other coated plates and sheets	1,084	2,095	3,304
Railway and tramway construction material	32,750	59,822	72,069
Wire rods	4,529	7,647	9,683
Wire	10,971	27,259	30,121
Tubes, pipes, and fittings	70,933	145,501	190,252
Iron castings	1,346	3,248	2,938
Steel castings	275	1,262	515
Forgings	263	972	850
TOTAL	284,847	549,043	768,692

* Not separately distinguished before 1955.

† The figures for 1955 are not completely comparable with those for previous years.

WICKMAN, LIMITED—Mr. R. J. Dixon has been appointed a director.

INTERNATIONAL COMBUSTION (HOLDINGS), LIMITED—Mr. J. P. Gilliver and Sir James R. Young have been appointed to the board.

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED—Viscount Bracken, Mr. Alexander Hood, Sir Eric Speed, and Sir William Morgan have been elected directors of the company.

British Blast Furnaces in the March Quarter, 1955

(These tables are published through the courtesy of the British Iron and Steel Federation.)

Derbyshire, Leicestershire, Notts, Northants, and Essex.

Name of firm.	In blast at end of the first quarter, 1955.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Clay Cross Co. (Iron & Foundries)	—	—	1	—	1	1	2
Ford Motor	—	—	1	—	1	1	1
Holwell Iron	—	—	3	—	3	3	4
Kettering Iron & Coal	—	—	2	—	2	2	2
New Cranaley Iron & Steel	—	—	1	—	1	1	2
Renishaw Iron	—	—	2	—	2	2	2
Sheepbridge	—	1	1	—	2	2	2
Stanton Ironworks: Stanton-by-Dale	—	—	4	—	4	4	5
Staveley Iron & Chemical	—	—	4	—	4	4	4
Stewarts and Lloyds: Corby	—	4	—	—	4	4	4
Wellingboro' Iron	—	2	—	—	2	2	3
TOTAL	—	7	19	—	26	26	31

Lancashire (excl. N.-W. Coast), Denbighshire, Flintshire, and Cheshire.

Brymbo Steel	—	1	—	—	1	1	1
Darwen & Mostyn	—	—	—	1	1	1	2
Lancashire Steel Corp'n.	—	2	—	1	3	3	3
Summers, J.	—	1	—	—	1	1	1
TOTAL	—	4	—	2	6	6	7

North-West Coast.

Barrow Ironworks	2	—	—	—	2	2	4
Charcoal Iron	—	—	1	—	1	1	1
Millom & Askam	2	—	—	—	2	1.9	3
United Steel: Workington	2	—	—	1	3	3	3
TOTAL	6	—	1	1	8	7.9	11

Lincolnshire.

Appleby-Frodingham	—	4	—	—	4	4	6
Lysaght's Scunthorpe Works	—	3	—	—	3	3	3
Thomas, R., & Baldwins: Redbourn	—	3	—	—	3	2.9	3
TOTAL	—	10	—	—	10	9.9	12

North-East Coast.

Consett Iron	—	3	—	—	3	3	3
Dorman Long (Steel) Acklam	—	2	—	—	2	2	4
Redcar	—	2	—	—	2	2	2
Cleveland	—	2	—	—	2	2	4
Bessemer	—	2	—	—	2	2	3
South Bank	—	—	—	2	2	2	3
Gjers, Mills & Co.	2	—	—	—	2	2	5
Normanby Ironworks	2	—	—	—	2	2	3
Skinningrove Iron	—	1	—	—	1	1	3
South Durham Steel & Iron:							
West Hartlepool	—	2	—	—	2	2	2
Cargo Fleet	—	2	—	—	2	2	2
TOTAL	4	16	—	2	22	22	34

Scotland.

Bairds & Scottish Steel: Gartsherrie	—	1	2	—	3	3	5
Carron	—	—	1	—	1	1	4
Colvilles: Clyde Works	—	3	—	—	3	3	3
Dixon's	—	2	—	—	2	2	6
TOTAL	—	6	3	—	9	9	18

South Wales and Monmouthshire.

Briton Ferry Works	1	—	—	—	1	1	1
Guest Keen Iron & Steel: Cardiff	2	2	—	—	4	3.1	4
Thomas, R., & Baldwins: Ebbw Vale	—	2	—	—	2	2	3
Steel Company of Wales: Margam	—	3	—	—	3	3	3
TOTAL	3	7	—	—	10	9.1	11

More Stainless Steel Plea

Benefits which would ensue from an extension of the use of stainless steel were mentioned by Mr. F. Pickworth, chairman of Firth-Vickers Stainless Steels, Limited, Sheffield, at a luncheon arranged by his company for guests to the Cutlers' Feast.

Appealing to scientists to find new methods of making stainless steel, Mr. Pickworth said that loss through corrosion must form a large proportion of the output of steel throughout the world.

Unfortunately, the extent to which the production of steel could be increased was governed by the availability of certain alloys which were in short supply. The industry was allowed only a specified amount of metal.

The Master Cutler, Mr. W. G. Ibberson, said the introduction of stainless steel created a greater change in the cutlery industry than any other event.

Steel Mission Returning

The British steel mission, led by Sir Eric Coates, which has been in India under the Colombo Plan to prepare a scheme for the third State - owned 1,000,000 - ton steel plant, left for England on Friday of last week.

Members of the mission returned to New Delhi after visiting industrial centres in Bengal and Bihar, and last Tuesday they met the Government of India's negotiating committee.

It is likely that the mission will suggest Durgapur, in west Bengal, as the site of the plant.

Machine-tool Agreement

Under a long-term manufacturing agreement, which Craven Bros. (Manchester), Limited, has entered into, certain of the smaller lines of machine tools of the company's design and specification will be manufactured by Crossley Motors, Limited, Stockport, and Urquhart Lindsay & Robertson Orchar, Limited, Dundee. The former is a subsidiary of the Associated Commercial Vehicles group and the latter of the Fairbairn Lawson Combe Barbour group.

It is not expected, however, that these arrangements will have a material effect on the Manchester company's sales before 1956, but from then on the effect should be considerable. The board is to raise additional permanent capital by the offer of 800,000 5s. ordinary shares at 12s. 6d. per share to ordinary stockholders in the proportion of two for five.

British Blast Furnaces in the March Quarter, 1955 —*continued*

Staffordshire, Shropshire, Worcestershire, and Warwickshire.

Name of firm.	In blast at end of the first quarter, 1955.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Goldendale Iron	—	—	1	—	1	1	2
Lilleshall	—	—	1	—	1	1	2
Round Oak Steel Works	—	—	—	—	—	—	2
Shelton Iron, Steel & Coal	—	3	—	—	3	3	3
Stewarts and Lloyds: Bilston	—	2	—	—	2	2	4
TOTAL	—	5	2	—	7	7	13
Sheffield.							
Park Gate Iron & Steel	—	2	—	—	2	2	2
GRAND TOTAL	13	57	25	5	100	98.9	139

Weekly Average Number of Furnaces in Blast during the March Quarter, 1955, and the Previous Four Quarters

District.	1954.				1955.
	March.	June.	Sept.	Dec.	March.
Derby, Leics., Notts., Northants, and Essex	26.2	25.8	24.2	25.8	26
Lancs. (excl. N.-W. Coast), Denbigh, Flint, and Ches.	6	6	4.2	5	6
Lincolnshire	11.2	10.3	9.3	9	9.9
North-East Coast	25	25	22.9	22	22
Scotland	9	9.1	9	9	9
Staffs., Shrops., Worcs., and Warwicks.	9	8.5	8.6	7.2	7
S. Wales and Monmouth	8.9	9	8.7	9	9.1
Sheffield	2	2	2	2	2
North-West Coast	8	7.5	7	7.6	7.9
TOTAL	105.3	103.2	95.9	96.6	98.9

The following companies have furnaces in course of construction or rebuilding:—John Summers; Dorman Long (Steel) (2); Lancashire Steel Corporation; South Durham Steel & Iron (West Hartlepool and Cargo Fleet); Steel Co. of Wales; Renishaw Iron; Lysaght's Scunthorpe Works.

Vickers Pays Out More

Increased profits are announced by Vickers, Limited, whose equity dividends for 1954 will absorb £1,294,666 —£278,638 more than in the previous year. Group profits, before tax, etc., have expanded from £6,812,593 to £7,800,126. Tax is up from £3,867,007 to £4,091,731. Total net assets have increased from £62,684,081 to £68,526,323.

The final dividend on the £27,709,839 ordinary capital is 6 per cent. less UK tax of 8s. 6d. The 2½ per cent. interim was on smaller capital as the 3,078,871 shares issued as rights last August were not then ranking. For 1953, on £12,315,484 before the scrip (100 per cent.) and rights issues, the final was 12½ per cent., to make 15 per cent.

An offer on a share exchange plus cash basis is to be made by Vickers, Limited, for the 1,011,603 10s. ordinary shares in Powers-Samas Accounting Machines, Limited. For every two Powers-Samas ordinary, holders will be offered three £1 ordinary shares in Vickers, plus 3s. in cash for each Powers-Samas share. Vickers already holds 1,988,397 Powers-Samas shares or 66.28 per cent. of the 3,000,000 in issue and full acceptance would make Powers-Samas a wholly owned subsidiary of Vickers.

THE THIRD British Instrument Industries' Exhibition is to be held at Earls Court, London, from June 28 to July 9.

United Steel's Expansion

Since the war the United Steel Companies, Limited, group has acquired the Yorkshire Engine Company, Limited, Sheffield, and the Distington Engineering Company, Limited, Workington (Cumberland), and has formed another company at Scunthorpe. The expansion of the organization is now carried a step further with its acquisition of Owen & Dyson, Limited, wheel and axle manufacturers, of Rotherham. The United Steel group now owns four iron and steel concerns, four engineering firms, a coke-oven plant, and a chemical products company.

Owen & Dyson sprang out of a partnership between two engineers in 1838. The business started with an output of one set of wagon wheels a day. To-day it turns out about 300 to 400 a day. United Steel has had a substantial share in the company for some years. The managing director of Owen & Dyson is retiring and Mr. Andrew Jollie, general manager of the Steel, Peech & Tozer Branch of the United Steel Companies, is taking over.

Another purchase made last week by the United Steel Companies was that of The Mount, Broomhill Road, Sheffield, which was previously owned by a Sheffield store. United Steel will use the building as administrative headquarters, and its present offices in Westbourne Road, from which it hopes to move in about 18 months' time, will be sold. The Mount will accommodate between 160 and 180 office workers.

Company News

BRADLEY & COMPANY, LIMITED, makers of holloware, sheet-metal workers, etc., of Bilston (Staffs)—For 1954 the dividend is 25 per cent., compared with 22½ per cent. in 1953.

ENGINEERS & IRONFOUNDERS, LIMITED—With a final dividend of 22½ per cent., the total for 1954 is 25 per cent., comparing with the 1953 total of 22½ per cent., which included a final dividend of 20 per cent.

BRITISH ROLL MAKERS' CORPORATION, LIMITED—Mr. O. F. Grazebrook, chairman, says that 1955 started with good order-books and the projected increase in UK steel production over the next few years is a good augury for rollmakers.

GLENFIELD & KENNEDY HOLDINGS, LIMITED—Ordinary shareholders will receive a final dividend of 15 per cent. to make 20 per cent., less tax, for 1954. The final for the previous year of 12 per cent. made a total of 17 per cent. on the £1,400,000 equity.

SIEBE, GORMAN & COMPANY, LIMITED, makers of diving and breathing apparatus, of Tolworth (Surrey)—While the dividend for 1954 is maintained at 12 per cent., a bonus of 5 per cent. is also being paid. After tax, profit for the year is £131,984, against £65,524 in 1953.

TEXTILE MACHINERY MAKERS, LIMITED—United Kingdom orders placed in 1954 have never been exceeded and there is reasonable hope that the present level of production will be maintained in the current year. The major rebuilding scheme approved by the board will cost over £750,000.

HOPKINSON, LIMITED, engineers, makers of boiler mountings and valves, etc., of Huddersfield—The ordinary dividend is being raised by 5 per cent. to 25 per cent., less tax, for the year to January 31. The previous year's total of 20 per cent., less tax, comprised an interim of 7½ per cent., and a final of 12½ per cent.

MUREX, LIMITED—The company proposes to distribute to its ordinary stockholders £220,000 of a capital profit of approximately £248,000, which, it is stated, has arisen from the recent disposal of the minority holding in Hard Metals, Limited, Transvaal. The distribution will be made in the form of a tax-free payment of 2s. per £1 ordinary unit.

STURTEVANT ENGINEERING COMPANY, LIMITED—A final dividend of 11½ per cent., tax free, is recommended by the board on the £887,652 one-class capital as doubled by a free scrip issue. This, with the 5½ per cent. interim on £443,826, makes a total equivalent to 14⅛ per cent., tax free, for 1954 on £887,652, absorbing £127,600. Group profits increased to £990,361 from £743,476.

LAURENCE SCOTT & ELECTROMOTORS, LIMITED—A dividend of 12½ per cent. is announced on a capital doubled to £882,190 by way of a 100 per cent. scrip issue in "A" ordinary shares. For the previous 12 months shareholders received a dividend of 17½ per cent. and a bonus of 2½ per cent. on half the present capital. The preliminary statement shows that the net profit expanded from £188,286 to £298,323.

ROBEY & COMPANY, LIMITED, engineers and boiler makers, of Lincoln—The company is raising the dividend from 30 per cent. to 35 per cent. for 1954 and, subject to CIC consent, proposes to make a one-for-one free scrip issue. The directors state that this does not imply an intention to recommend the distribution of any larger amount by way of dividend in future years. Trading profits expanded from £100,384 to £166,104.

ELLIOTT BROS. (LONDON), LIMITED, makers of electrical measuring instruments, etc.—A profit of £222,878 is announced for 1954, compared with £142,802 in the previous year. An interim dividend of 7 per cent. on £308,000 ordinary stock absorbed £11,858 against nil in the previous year. The final dividend on £462,000 ordinary stock at 12 per cent. (against 20 per cent. on £220,000) absorbed £31,878, compared with £24,200.

W. T. HENLEY'S TELEGRAPH WORKS COMPANY, LIMITED—In addition to maintaining the ordinary dividend for the year 1954 at 10½ per cent., less tax, with an unchanged final of 8 per cent., the company is making a special distribution out of capital profits of 2 per cent., tax free. Group profits (subject to audit), after all charges and provisions, including £432,729, against £578,699 for taxation, are down at £514,574, compared with £692,760 previously.

BABCOCK & WILCOX, LIMITED—The directors recommend a final dividend of 8 per cent., making 15 per cent. for the year 1954 on the ordinary capital of £7,524,398. This is an effective increase of 3 per cent. on the total distribution for 1953. For that year an interim of 7½ per cent. was paid before the one-for-two scrip issue, followed by a final of 7 per cent. on the present capital, making a total equivalent of 12 per cent. on the current equity. The preliminary statement shows that group profits, excluding two foreign subsidiaries, are £4,104,153, compared with £4,149,618 for 1953.

BRITISH INSULATED CALLENDER'S CABLES, LIMITED—The company is maintaining for 1954 the previous year's payments on the £12,350,000 ordinary capital of a 10 per cent. total dividend, less tax, and a special distribution of 2½ per cent., not subject to tax, which is being made out of the balance of realized capital profits brought forward from 1953 and profits on realization of investments and properties in 1954 now transferred to capital reserves. Group trading profits, which in 1953 declined from the 1952 record £9,522,076 to £8,344,074, show a further fall of nearly £1,000,000, at £7,362,580.

ENFIELD ROLLING MILLS, LIMITED—As soon as conditions are expedient the board is to fund a portion of the short-term borrowings by raising fresh capital, says the chairman, the Earl of Verulam, in his survey for last year. The directors also seek power to borrow up to twice the nominal amount of the issued share capital, plus the amount of any share premium account. Referring to the heavy risk the company carries in its copper stocks, the chairman declares that, unless the backwardation is narrowed, so that hedging can be done cheaply on the London Metal Exchange, the company may have to face a substantial loss on stocks.

BRITISH CHROME & CHEMICALS (HOLDINGS), LIMITED—With busy trading conditions throughout 1954 and group trading profit expanding from £433,350 to £562,780, Mr. E. F. Wright, the chairman, reports that so far during the current year there seems no sign of any alteration in trade. Production has restarted at Glasgow, after the explosion last March, and the chairman believes full output will be achieved by the end of May. The chairman warns, however, that adequate plant replacement from provisions for depreciation is nowadays a complete illusion. Out of gross earnings of nearly £580,000, depreciation, transfers to replacement reserve, and taxation absorbed very nearly £490,000, he adds.

News in Brief

RUHRSTAHL, one of Western Germany's largest steel concerns, is planning to send experts to the Philippines to investigate the prospects of iron and nickel ore mining on Mindanao Island.

THE Edison Swan Electric Company, Limited, a subsidiary of Associated Electrical Industries, Limited, has absorbed two other subsidiaries, British Mechanical Productions, Limited, and General Accessories, Limited.

THE D'Arcy Exploration Company, Limited, which is undertaking on behalf of the Gas Council a five-year search for natural gas throughout Britain, will be starting survey work in the Cheshire basin during the coming summer.

DISCUSSIONS began in London on April 28 between the Government and a Bulgarian delegation regarding trade and the settlement of all debts due to United Kingdom nationals from Bulgaria and of all UK claims against Bulgaria.

CLYDESIDE CRAFTSMEN engaged on the construction of the Empress of Britain will be interviewed in an outside television broadcast from the yard of the Fairfield Shipbuilding & Engineering Company, Limited, at Govan, Glasgow, on May 10.

A SEPARATE small-tool export department has been established at the Sparkbrook works of B.S.A. Tools, Limited. Mr. E. J. Abbey has been appointed export manager, small-tools division, and Mr. J. D. Wilcock is now assistant export manager.

SMALL CONCERNS displaced by redevelopment in Birmingham are to be housed in "factory colonies" under a scheme being prepared by the Midland Area of the National Union of Manufacturers. Four sites on 75-year leases have been offered by Birmingham Corporation.

CANADIAN producers' deliveries of primary iron and steel shapes fell to 2,565,752 tons in 1954, from 3,236,137 tons in 1953. It is also announced that carbon-steel deliveries decreased to 2,476,377 tons from 3,082,815 tons and alloy steel to 89,375 tons from 153,322 tons.

A SERIES of one-day conferences on work-study arranged by the Glasgow Productivity Council for the week beginning May 23 has been postponed because of the General Election. The conferences were to be conducted by the British Productivity Council's work-study unit, and arrangements are being made to invite the unit to Glasgow in the autumn.

THE LIGHT METAL FOUNDERS' ASSOCIATION point out that in the report of the symposium organized by the IBF on "Melt-quality Tests," contained in the JOURNAL of April 14, reference was made to Mr. J. Wood as representing the Association. In actual fact Mr. Wood does not represent the LMFA; his company is a member of the Federation of Light Metal Smelters.

TO COMMEMORATE the 50th anniversary of the movement, Droitwich Rotary Club staged the first industrial exhibition in the town, illustrating the great increase in new businesses established there since the war. Under the title "Droitwich Makes It," 24 firms combined to provide a varied cross-section of the town's products. The exhibition opened on April 20 for three days.

THE INSTITUTE OF WELDING and the British Welding Research Association held a luncheon at the Hyde Park Hotel on April 25, to celebrate the eightieth birthday of Sir William J. Larke, K.B.E. Sir Claude Gibb, C.B.E., F.R.S., was in the Chair, supported by the president of the Institute, Mr. R. G. Braithwaite, and the chairman of Council of the British Welding Research Association, Sir Charles Lillicrap, K.C.B., M.B.E.

BRITAIN'S INDUSTRIAL ACHIEVEMENT since the war justified hope but not complacency, said Sir George Schuster at the annual luncheon of Walsall Chamber of Commerce on April 26. Though the volume of exports had increased "astonishingly," it must be remembered that our total share of world trade had not risen above the 1938 figure. "I believe we are now in one of the most crucial periods in our history," Sir George said.

THE LORD MAYOR OF SHEFFIELD, Alderman J. H. Bingham, toured the works of the English Steel Corporation on April 26, accompanied by Mr. F. Pickworth, managing director, and Dr. C. J. Dadswell, director. The Lord Mayor recalled that 20 years ago he was employed in the River Don works of the Corporation. After being entertained to luncheon the Lord Mayor spent the afternoon seeing the Corporation's apprentice training scheme.

FROM the metallurgist's viewpoint, a rather unusual conference was held in London recently to discuss the problems of corrosion of metals by fertilizers. It was organized by the Institution of British Agricultural Engineers and the Fertilizer Society and held on April 21. Four papers were given, dealing with the mechanism of corrosion, methods adopted by fertilizer manufacturers to reduce attack, corrosion of steel in relation to fertilizer chemicals, and problems of its prevention on the farm.

AT A DINNER given by Imperial Chemical Industries, Limited, at Kynoch Works, Witton, Birmingham, on April 22, Mr. S. F. Burman, a director of the company, said that the development of automatic machines had not only taken a great deal of the drudgery out of industry but had brought to many the means of creating things of beauty and precision only previously available to the craftsman particularly gifted with his hands and brains. Awards for long service were distributed by Mr. Burman to 316 employees.

INSPECTION EQUIPMENT, 19, Broad Court, Drury Lane, London, W.C.2, has obtained the sole agency and will provide servicing for Fedrex portable industrial X-Ray units. This equipment is manufactured by the Carl Drenck Electro-Technical Laboratories, Copenhagen, and four units are currently available; 120, 160, 200, and 260 kv. The units are built to give complete portability together with a penetrating power strictly comparable with that of very much heavier equipment of more conventional design. The cooling system is such that the units can be used continuously for long periods without the risk of overheating.

BRITISH SHIPYARDS "are handicapped by the situation in the industry where the number of unions involved is legion and where the lines of demarcation between the various jobs allowed to be performed by the various union members are too often carried to almost absurd extremes. They are certainly a great impediment to the industry when competing with yards abroad," said Mr. Haakon Christophersen, president, at the annual luncheon of the Norwegian Chamber of Commerce in London. "Norwegian shipowners know perfectly well that nowhere can they have ships better built than in the United Kingdom, and it is therefore with great regret that they are forced to go elsewhere where prices are not so high and delivery is much shorter," he declared.

News in Brief

BRITAIN is to have a permanent exhibition in London, where well-designed products from many British industries will be displayed as a stimulus to her home and export trade. The Council of Industrial Design is now able to announce that the premises of the Design Centre for British Industries will be in the West End of London at 28, Haymarket, S.W.1. Arrangements are being made to open the Centre as a permanent but changing exhibition early in 1956. The Design Centre will show a wide range of products, selected by the CID for their high standard of design, which will attract home and overseas buyers as well as the Press and the general public. The exhibits will mainly be durable consumer goods of various price levels, such as textiles, furniture, kitchen equipment, hardware, office machinery, lighting and heating appliances, garden tools, etc.

THE COUNCIL of the Institution of Mechanical Engineers are arranging an International Conference on "Fatigue of Metals" to be held from September 10 to September 14, 1956, inclusive. Sessions for the delivery of papers will be held daily from 10.00 a.m. to 12.30 p.m. and from 2.30 p.m. to 5.30 p.m. It is hoped to obtain up to sixty papers covering the whole field, and these will be divided into groups, the papers in the various groups being presented for discussion in abstract form by reporters. The presentation of the papers will be preceded by an address reviewing the field of knowledge of fatigue. The address will be presented by Dr. H. J. Gough, C.B., M.B.E., F.R.S., a past-president and honorary member of the Institution. Details of provisional arrangements for the sessions are obtainable from the secretary of the Institution of Mechanical Engineers, 1, Birdcage Walk, Westminster, London, S.W.1.

ADDRESSING members of the Midland Region of the Engineering Industries' Association at their annual luncheon in Birmingham on April 26, Viscount Davidson, national president of the Association, made a strong appeal for the exclusion of party politics from trade union affairs. He said American workers had a completely different approach from those in this country. They kept politics and industry separate and were concerned only that the company for which they worked should be prosperous. They did not regard profits as something wicked but as a commendable reflection on the efficiency of a firm and the prospects of its workers. Mr. Arthur Keats, chairman of the Midland region of the Association, said that when our overseas trade was out of balance, British manufacturers ought to feel in honour bound to seek exports even if foreign trade was not so easily obtained, nor so remunerative as trade with the home markets.

A CONTENTION by apprentice speakers at the annual B.S.A. apprentices' dinner in Birmingham, on April 22, that Britain was in the throes of its greatest industrial revolution was endorsed by directors of the parent board of the B.S.A. Company, Limited, Sir Frank Smith and Sir Patrick Hannon (deputy chairman). Mr. A. R. Winwood, an apprentice, proposing the toast to the company, said that with the development of atomics and electronics an additional burden was being placed on apprentices in many industries and apprentice schemes in general would need radical reorganization. The length of the apprenticeship period may have to be extended from five to eight years, he suggested, so that training can be given in new techniques. Sir Patrick Hannon, replying, said that more than ever industrial expansion was necessary to meet increasing competition in overseas markets, notably Western Germany. This view was supported by Sir Frank Smith, who recently returned from Latin America.

New Outlook on Pneumoconiosis

Two doctors attached to the Medical Research Council pneumoconiosis research unit make a plea in an article in the current issue of the "British Medical Journal" for a better understanding of the disease. Dr. J. C. Gilson and Dr. G. S. Kilpatrick, of Llandough Hospital, Cardiff, point out that because a sufferer is likely to be more familiar with the effects produced by complicated pneumoconiosis he may be under a serious misapprehension about the gravity of his condition. An application to men with simple pneumoconiosis, who form the majority, that the lungs show evidence of dust accumulation but that it may cause them no disability often puts their condition in a new perspective. The doctors emphasize that the disease, at any stage, is a slowly changing condition and even quite seriously disabled men with the complicated form may be able to look forward to a number of years of useful life provided they find a job within their capacity.

Pneumoconiosis was also the subject of a question in the House of Commons this week, when Mr. John Dugdale asked the Minister of Health whether he would make available full-size X-ray plates for investigation of all foundry workers who may be suffering from the disease. The Minister (Mr. Iain Macleod) replied that examination by full-size X-ray plates was available free under the National Health Service for any person thought to be suffering from pneumoconiosis after clinical examination by a doctor or after examination by a mass radiography unit.

Head Wrightson's New Acquisition

Further expansion of the organization has been undertaken by the Head, Wrightson & Company, Limited, group, with the acquisition from the British Metal Corporation, Limited, of the entire share capital of Colliery Engineering, Limited, Sheffield, and its subsidiary, the Cupola Mining & Milling Company, Limited.

Following the acquisition, the board of Colliery Engineering now consists of Mr. Peter Wrightson, chairman, Mr. L. W. Needham, managing director, Mr. H. Cussons, and Mr. S. A. Casson. The members of the board of the Cupola Mining & Milling Company, which is now a direct subsidiary of Head, Wrightson, are now Sir John Wrightson, who has been appointed chairman, Mr. A. Chilton, managing director, Mr. Peter Wrightson, Mr. L. W. Needham, and Mr. H. Cussons.

Mr. George Bidgood

Mr. GEORGE BIDGOOD, who died on April 23, at his home at Chiswick, London, W.4, had served our sister publication IRON & COAL for well over half a century. In his 78th year at the time of his death, Mr. Bidgood had lived in semi-retirement since 1948, but until quite recently he had been a frequent visitor to these offices. He was held in the deepest affection by his colleagues, and directors and staff alike mourn his passing.

George Bidgood joined this company in January, 1901, and served throughout in the advertisement department, of which he eventually became manager. He took a keen interest in the Territorial Army, of which he was a member for many years. He served in South Africa with the City Imperial Volunteers and was called to the colours again in 1914, serving throughout the first world war with the Middlesex Regiment.

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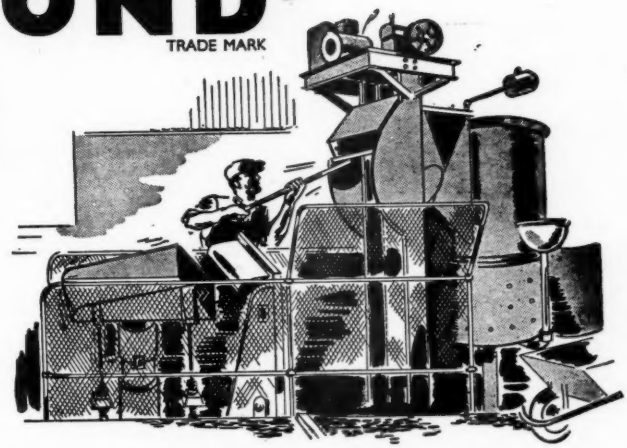

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C.H.F. 13

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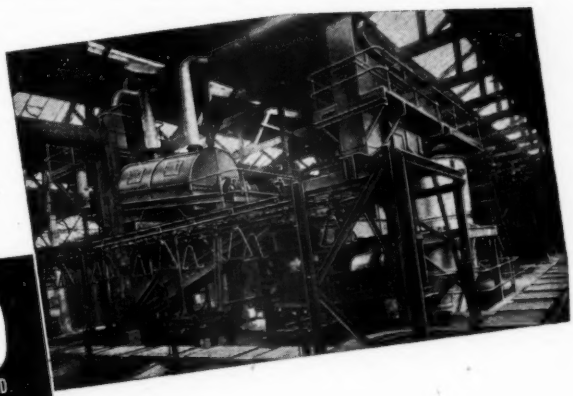

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F.T.2

Personal

MR. T. H. ARNOLD, president of the Sheffield Metallurgical Association, has been elected to the Council of the Iron and Steel Institute.

SIR LEONARD LORD, K.B.E., chairman and managing director of the British Motor Corporation, has been elected president of the Institution of Production Engineers.

COLONEL A. C. R. WAITE, a director of the Austin Motor Company, has been elected vice-president of the Permanent Bureau of the International Association for Car Manufacturers for 1955-56.

MR. ROBERT HORLOCK, manager of the Sheffield office of Metropolitan-Vickers Electrical Company, Limited, since 1947, has been transferred to the firm's export company as manager for Canada.

MR. E. J. EDWARDS has been appointed branch manager at the London office of the Brightside Foundry & Engineering Company, Limited, at Craven House, 16, Northumberland Avenue, W.C.2.

MAJOR-GEN. PETER DE HAVILLAND, who has been Chief of Staff, Northern Command, since 1953, is leaving the Army to take up the appointment of special assistant to Mr. David Brown, of the David Brown Corporation.

MR. ANDREW PAXTON has been appointed general manager of the Greenock Dockyard Company, Limited. He has been with William Denny & Bros., Limited, Dumbarton, where he served his apprenticeship in the shipyard drawing office.

MR. WILLIAM HEAPS, who has charge of the inspection department at the Birkby factory of Hopkinsons, Limited, valvemakers, etc., of Huddersfield, and is still regularly at work, received presentations from the directors and the staff on his 80th birthday last month. He has been with the company for 54 years.

DR. B. CINA, of the Brown-Firth research laboratories, Sheffield, was presented with an Andrew Carnegie silver medal for 1954 at an Iron and Steel Institute presentation on April 27. The award was made for his work at Sheffield University on the effect of cold work on transformations in iron/nickel/chromium alloys.

MR. T. GODDARD MANDER is to retire shortly as director of the Sheffield and District Engineering Trades Employers' Association, but his services will still be available to the association for a time as adviser. Mr. Mander also remains chairman of Sheffield District Rollers' and Tilters' Association and Sheffield District Rollers', Tilters', and Forgers' Employers' Association.

MR. ASHLEY WARD was presented with the honorary degree of Doctor of Laws of Sheffield University in the Mappin Hall on April 27. The Public Orator, Professor D. Browne, said that it was in 1878 that Thomas Ward set up in business as a coal and coke merchant. Within the classic span of three-score-years and-ten that business had become the industrial empire of to-day.

THE 800-YEAR-OLD TOWN of Lymington, Hants, has conferred the Freedom of its ancient Borough on JOHN WILLIAM HOWLETT, O.B.E., the founder, chairman and managing director of Wellworthy Limited, manufacturers of piston rings, pistons, cylinder liners, aero engine castings, and other components. This is only the third time in its long history that the Borough has bestowed this honour on one of its inhabitants.

SINCE 1934 Mr. FRANK KASZ has for the most part lived in Scotland. A native of Manchester, he graduated from the university with honours in physics and went north two years later having obtained a further degree with honours in metallurgy. He joined the British Aluminium Company, Limited, and is now leaving Falkirk, where he is head of the company's experimental department, to become the BAC's chief metallurgist in London.

AT A CONGREGATION of Durham University in Newcastle-upon-Tyne in July the honorary degree of Doctor of Science will be conferred on Mr. J. RAMSAY GEBBIE, managing director of William Doxford & Sons, Limited, the Sunderland shipbuilders and marine engineers. Mr. Gebbie has been closely associated with the university as chairman of the advisory committee on naval architecture at King's College, Newcastle-upon-Tyne, and as a member of the Council of the College.

LANARKSHIRE FURTHER EDUCATION SUB-COMMITTEE have appointed Mr. RAYMOND H. GARNER to be principal of Coatbridge Technical College in succession to Dr. ROBERT RUSSELL, who retires in June. Mr. Garner has been principal of the School of Engineering at Burnbank since December, 1947. Previously he had been head of the engineering and science department of Blackpool Technical College. He is a B.Sc. (Eng.) of London University, and holds high engineering qualifications.

Obituary

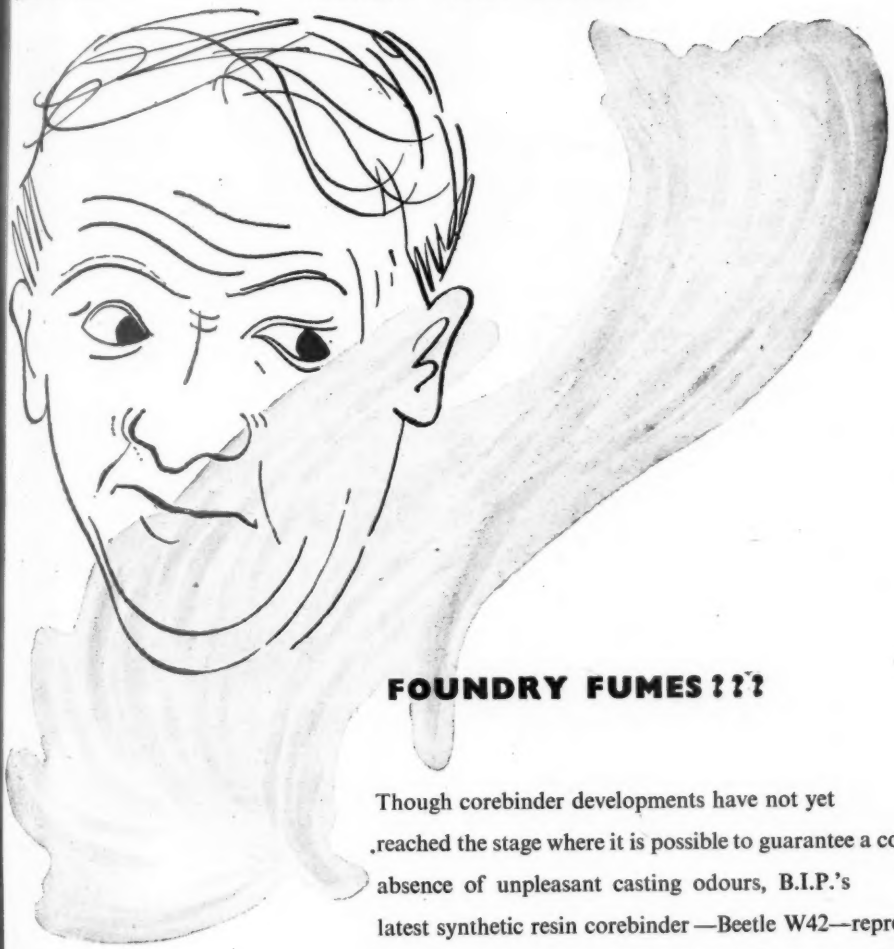
THE SUDDEN DEATH in Calcutta at the age of 43 is reported of Mr. NORMAN WOOD, of Halifax. He was former works manager for India Pistons, Limited, and later became production manager for Burn & Company, Limited, Calcutta.

MR. W. B. PICKERING, former director and commercial manager of Hadfields, Limited, steel manufacturers, Sheffield, died on April 25 at the age of 87. He had spent 54 years with Hadfields, 31 as director and commercial manager. Mr. Pickering was a former president of the Sheffield Chamber of Commerce, and an executive member of the Association of British Chambers of Commerce.

The death occurred in Washington recently of Mr. WILLIAM TOMLINSON, who had been United States Treasury representative in Paris for the last eight years and before that had served in London for two years. Latterly Mr. Tomlinson had also been deputy to Mr. David Bruce representing the US on the European Coal and Steel Community and the European Defence Council. He was in his middle thirties.

FROM SYDNEY, Australia, comes the news of the death of Mr. TIMOTHY HUNT. He was the sole surviving original member of the British Foundrymen's Association, having joined in 1904. He had the intention of participating in the forthcoming International Foundry Congress. Mr. Hunt did not continue in membership, as most of his life was spent in Australia, mainly in the railway shops. Only once, and that was many years ago, did he revisit this country.

SIR NORMAN MIGHELL, whose death at the age of 60 is reported, was a director of the Zinc Corporation, Limited, the Consolidated Zinc Corporation Limited, and New Broken Hill Consolidated, Limited, and had been associated with many other companies in Australia. He was Deputy High Commissioner for Australia in the UK from 1946 to 1949 and acting High Commissioner in 1949-50. From 1941 to 1946 he was a Coal Commissioner for the Commonwealth.



FOUNDRY FUMES???

Though corebinder developments have not yet reached the stage where it is possible to guarantee a complete absence of unpleasant casting odours, B.I.P.'s latest synthetic resin corebinder—Beetle W42—represents a very considerable advance in this direction. Developed with the Garrett Report in mind, it combines all the advantages of Beetle W20 with a reduction in casting odour that will be appreciated by foundrymen.

use BEETLE RESIN W42* for reduced casting odour

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'Beetle' is a trade mark registered in Great Britain and in most countries of the World.

**Patent Application 32896/58*

Raw Material Markets

Iron and Steel

Engineering and speciality foundries are heavily engaged, and only the stringency in the supply of pig-iron and scrap prevents them increasing their outputs. They are implementing supplies of low-phosphorus iron and hematite with refined irons, the makers of which are committed for some weeks ahead.

Earlier in the year it was understood that supplies of hematite would be augmented by March or early April from a furnace going into blast on the West Coast, but this furnace is not yet operating and it appears likely to be another month or so before the extra supplies come on to the market. Inquiries abroad for hematite to augment home deliveries are meeting with little or no success, as it appears that there is a shortage on the Continent and prices there are some pounds above home-trade levels.

Meanwhile, the foundries are taking up all the suitable home-produced pig-iron they can obtain, and many in the English Midlands and farther south find it advantageous to pay the higher carriage rates on Scotch foundry iron.

Most of the jobbing foundries, which cater for many trades, are busy, and the light and textile foundries maintain a fair level of production. Some of the light foundries report a slight decrease in business, but this appears to be confined to the makers of castings for domestic equipment. All available supplies of high-phosphorus iron are utilized without adding appreciably to stocks, and in some instances the demand is larger than the supply.

There is a strong demand for heavy cast-iron and machinery scrap, and all available parcels are taken up readily. Coke deliveries are maintained.

The re-rollers of steel continue to be handicapped by the lack of billets, this position applying in all areas. They have excellent order-books for bars, sections, and strip for home and export, but because of the shortage of steel semis are in arrears with deliveries. Small supplies of imported billets have been brought in and it is understood that considerable quantities have been purchased, but it will be a month or so before these are available for distribution.

The pressure for supplies of heavy finished steel products is unabated, but deliveries of most products still fall far short of needs.

Non-ferrous Metals

A report early last week that there would be a further release of copper from Government stocks was denied by a Board of Trade spokesman, but not before the news had brought about selling on the market to an extent which brought the price down with a run. The contradiction encouraged a recovery in values which, however, was not maintained throughout the week. At the close, three months copper was below £300, at £298 sellers, losing £15, while cash stood at £310, a drop of £13 from the previous Friday. Consumers were not much in evidence here or on the Continent and the threat of a railway strike was, of course, something of a deterrent.

Tin was also lower last week with a drop of £5 10s. in cash and of £4 for three months. Lead was steady, but closed at £103 15s. for both positions, which was 15s. down on balance. In zinc the backwardation is maintained, but last week saw prompt down 15s. and forward 10s. lower.

The Board of Trade has announced that from tomorrow (Friday) separate licences will no longer be required for the import of unwrought aluminium, unwrought aluminium alloy, and aluminium scrap from any source.

Statistics published by the Copper Institute in New York show that in March United States production of crude copper was 6,800 short tons up, at 109,100 tons, while output of refined advanced from 123,200 tons in February to 135,000 tons in March. Deliveries to consumers jumped to 130,600 tons, which was more than 22,000 tons above the previous month. Outside the US the position was nearly as good, for although deliveries were 13,000 tons down, at 103,800 tons, output of refined copper was 12,200 tons up, at 101,800 tons. In crude copper, production amounted to about 134,600 tons, which was fully 20,000 tons better than the previous month's total, and was, no doubt, encouraged by the resumption of work at the Copperbelt.

At the weekend it was announced by the Rhodesian Selection Trust group that the Roan and Mufulira companies had decided to offer fixed prices to UK consumers who might achieve a degree of stability in the resale prices of copper and brass products. The price will remain fixed for not less than 30 days initially and then will be subject to change at 24 hours' notice, when the price again will remain fixed for a definite period.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* April 28, £313 10s. to £314; April 29, £310 to £311; May 2, £304 to £305; May 3, £302 10s. to £303; May 4, £302 to £303.

Three Months: April 28, £301 to £302; April 29, £299 to £299 10s.; May 2, £293 to £293 10s.; May 3, £291 10s. to £292; May 4, £290 to £291.

TIN, Standard—*Cash:* April 28, £715 to £715 10s.; April 29, £713 to £713 10s.; May 2, £709 to £710; May 3, £709 10s. to £710; May 4, £708 10s. to £709 10s.

Three Months: April 28, £715 to £716; April 29, £715 to £716; May 2, £712 10s. to £713; May 3, £712 10s. to £713; May 4, £713 to £713 10s.

LEAD—*Second half April:* April 28, £103 10s. to £103 15s.; April 29, £103 15s. to £104. *First half May:* May 2, £103 7s. 6d. to £103 12s. 6d.; May 3, £103 5s. to £103 10s.; May 4, £102 5s. to £102 10s.

Second half July: April 28, £103 10s. to £103 15s.; April 29, £103 10s. to £103 15s. *First half August:* May 2, £103 10s. to £103 15s.; May 3, £103 5s. to £103 10s.; May 4, £102 10s. to £102 15s.

ZINC—*Second half April:* April 28, £88 to £88 5s.; April 29, £88 10s. to £88 12s. 6d. *First half May:* May 2, £88 10s. to £88 15s.; May 3, £88 10s. to £88 15s.; May 4, £88 5s. to £88 10s.

Second half July: April 28, £87 to £87 5s.; April 29, £87 10s. to £87 15s. *First half August:* May 2, £87 5s. to £87 15s.; May 3, £87 5s. to £87 10s.; May 4, £87 5s. to £87 10s.

Recent Wills

BARNSLEY, ALFRED, a director of William Barnsley, Limited, non-ferrous founders, of Bilston (Staffs) £6,919

HUGHES, JOSEPH, chairman of John & Joseph Hughes, metal manufacturers and founders, of Birmingham £96,882

BATTEN, C. H., managing director of Ductile Steels, Limited, Willenhall (Staffs), a director of Dudley Port Rolling Mills, Limited, and other companies £114,637

LONES, J. H., former chairman of the South Wales and Monmouthshire Iron and Steel Manufacturers' Association, former chairman and managing director of the old Blaenavon Company, Limited, and chairman of the Monmouthshire and South Wales Coal Owners' Association ... £88,398

HOOKERLITE CORE TRAYS

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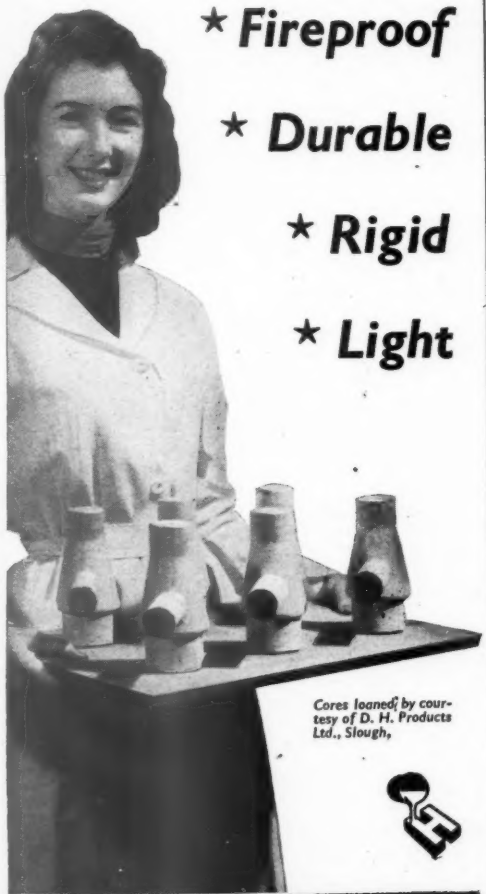
★ *Durable*

★ *Rigid*

★ *Light*



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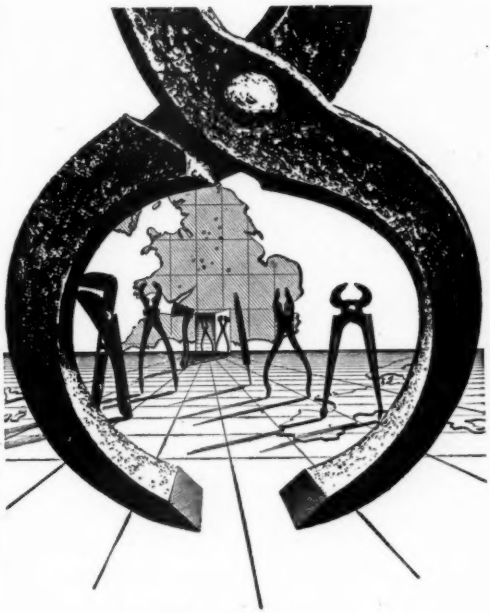

Pincer movement

Over a million pairs of pincers and pliers moved out of this country last year. With them went nearly five million files, as many assorted axes, and two thousand tons of hacksaw blades and twist drills.

These export figures for tools are a few out of many. They give some small idea of the world-wide demand for British-made steel products. Last year Britain's toolmakers alone earned £18 million for Britain.

Wherever there is steel there is British steel.

British steel leads the world

THE BRITISH IRON AND STEEL FEDERATION

S.93

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

May 4, 1955

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £15 12s. 0d.; Birmingham, £15 5s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £17 13s. 9d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £18 9s. 3d.

Scotch Iron.—No. 3 foundry, £18 2s. 3d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £20 4s. 0d.; South Zone, £20 6s. 6d.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £21 1s. 6d.; South Zone, £21 4s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. of England (local iron), £18 2s. 6d.; Scotland (Scotch iron), £18 9s. 0d.; Sheffield, £19 7s. 6d.; Birmingham, £19 14s. 6d.; Wales (Welsh iron), £18 9s. 0d.

Basic Pig-iron.—£15 15s. 6d. all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots).—40/55 per cent., £40 15s. 0d., basis 45 per cent. Si, scale 15s. per unit; 70/84 per cent., £63 0s. 0d., basis 75 per cent. Si, scale 16s. per unit.

Ferro-vanadium.—50/60 per cent., 23s. 8d. to 25s. 0d. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 11s. 0d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £161 0s. 0d. to £165 0s. 0d. per ton; 38/40 per cent., £258 0s. 0d. to £262 0s. 0d. per ton.

Ferro-tungsten.—80/85 per cent., 17s. 0d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 20s. 0d. per lb. of W.

Ferro-chrome (6-10 ton lots).—4/6 per cent. C, £82 0s. 0d. to £84 0s. 0d., basis 60 per cent. Cr, scale 25s. 0d. per unit; over 6 per cent. C, £80 0s. 0d. to £82 0s. 0d., basis 60 per cent. Cr, scale 24s. 0d. per unit; 2 per cent. C,* 1s. 10d. per lb. Cr; 1 per cent. C,* 1s. 11d. per lb. Cr; 0.15 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr; 0.10 per cent. C,* 1s. 11d. to 2s. 2d. per lb. Cr; 0.06 per cent. C,* 2s. 3d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 7½d. to 7s. 1d. per lb.

Metallic Manganese.—93/95 per cent., carbon-free, £225 0s. 0d. to £232 0s. 0d. per ton; 96/98 per cent., £259 0s. 0d. to £265 0s. 0d. per ton.

Ferro-columbium.—60/75 per cent., Nb + Ta, 52s. 6d. to 70s. 0d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £53 17s. 6d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £25 5s. 0d.; tested, 0.08 to 0.25 per cent. C, £26 5s. 0d.; hard (0.41 to 0.60 per cent. C), £27 10s. 0d.; silico-manganese, £34 10s. 0d.; free-cutting, £29 6s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £32 17s. 0d.; silico-manganese, £34 10s. 0d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £29 13s. 6d.; basic, hard, over 0.41 up to 0.60 per cent., C, £30 16s. 0d.; acid, up to 0.25 per cent. C, £33 15s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £31 1s. 6d.; boiler plates (N.-E. Coast), £33 11s. 6d.; floor plates (N.-E. Coast), £32 10s. 6d.; sectional material, N.-E. Coast, £29 4s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £31 19s. 6d.; flats, 5 in. wide and under, £31 19s. 6d.; hoop and strip, £33 1s. 6d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £34 5s. 0d.; black sheets (hand mill), 17/20 g., £43 13s. 6d.; galvanized corrugated sheets, 24 g., £55 4s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £54 7s. 0d.; nickel-chrome, £76 7s. 9d.; nickel-chrome-molybdenum, £86 8s. 6d.

NON-FERROUS METALS

Copper.—Cash, £302 0s. 0d. to £303 0s. 0d.; three months, £290 0s. 0d. to £291 0s. 0d.; settlement, £303 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 3s. 1d. per lb.; rods, 360s. 6d. per cwt. basis; 20 s.w.g., 391s. 9d. per cwt.

Tin.—Cash, £708 10s. 0d. to £709 10s. 0d.; three months, £713 0s. 0d. to £713 10s. 0d.; settlement, £709 10s. 0d.

Lead (Refined Pig).—First half May, £102 5s. 0d. to £102 10s. 0d.; first half August, £102 10s. 0d. to £102 15s. 0d.

Zinc.—First half May, £88 5s. 0d. to £88 10s. 0d.; first half August, £87 5s. 0d. to £87 10s. 0d.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £119 7s. 6d.; rolled zinc (boiler plates), all English destinations, £117 2s. 6d.; zinc oxide (Red Seal), d/d buyers' premises, £103 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 2s. 5⅛d. per lb.; rods, drawn, 3s. 3¾d.; sheets to 10 w.g., 323s. 9d. per cwt.; wire, 3s. 1d.; rolled metal, 309s. 6d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £203; B6 (85/15), £298; BS249, —.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £258; HTB2 (38 tons), £269; HTB3 (48 tons), £278.

Gunmetal.—RCH, 3/4 per cent. tin, —; BS1400, LG2 (85/5/5/5), £277; LG3 (86/7/5/2), £288; G1 (88/10/2/½), £358; (88/10/2/1), £352.

Phosphor Bronze.—BS1400, PB1 (AID released), £379 per ton.

Phosphor Bronze Strip, etc.—Strip, 450s. 0d. per cwt.; sheets to 10 w.g., 473s. 6d. per cwt.; wire, 4s. 7½d. per lb.; rods, 4s. 0d.; tubes, 3s. 10½d.; chill cast bars: solids 4s. 0d., cored 4s. 1d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 9½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 2½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 1¾d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 3d. per lb. Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £108 0s. 0d. Nickel, £519 0s. 0d. Aluminium, ingots, £163 0s. 0d.; aluminium bronze (BS1400), AB1, £337; AB2, £340. Solder, brazing, BS1845, 2s. 9d. lb.; granulated, 3s. 0d. lb.

* Average 68-70 per cent.